DOCUMENT RESUME

ED 224 898 CE 034 564

TITLE	Data Processing 202, 302. Interim Guide.
INSTITUTION	Manitoba Dept. of Education, Winnipeg.
REPORT NO	ISBN-0-86497-098-6
PUB DATE	82
NOTE	211p.
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	Behavioral Objectives; Business; *Business Education; Computer Oriented Programs; Computers; Computer Science; Curriculum Guides; *Data Processing; Guidelines; Information Dissemination; Instructional Materials; Learning Activities; *Office Occupations Education; Problem Solving; *Program Development; *Program Implementation; Programing; Resource Materials
IDENTIFIERS	*Manitoba

ABSTRACT

This interim curriculum guide is designed to provide a framework upon which teachers in Manitoba may base their secondary school data processing program for 1982-1983. Covered first are course rationales, time allotments, and goals and objectives for Data Processing 202 and Data Processing 302. The bulk of the guide consists of lists of goals and objectives, teacher's notes and suggested activities, and reference and support materials for use in implementing each of the two courses. Discussed in the section on Data Processing 202 are the following topics: historical developments and orientation, computer technology in business, communication of information, processing data on a computer system, problem solving and flowcharting, programming, and introduction to computer business applications. The section devoted to Data Processing 302 includes additional materials on programming and business applications. Also provided are eight transparency masters. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED224898

DATA PROCESSING 202, 302

Interim Guide

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

PROVINCE OF MANITOBA

DEPARTMENT OF EDUCATION

1982

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

K A Cosens

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

This guide is subject to revision on the basis of information received from schools during the 1982-83 school year. It is expected that modifications will not be in the design of the program; rather, changes may be made in areas concerning implementation, strategies and resource materials.

CE 034 504

The interim guide for Data Processing 202, 302 has been developed as part of the overall revision of the Business Education program for the secondary schools of Manitoba and is part of the Accounting cluster of courses designed to provide guidelines for vocational business education. It is based on recommendations included in the Vocational Area Task Force Report of 1978 as well as on suggestions from secondary school and community college teachers and representatives from universities and industry. This guide provides the framework upon which teachers may base their Data Processing program for 1982-83. A final Data Processing 202, 302 guide may be available in September 1983.

ACKNOWLEDGEMENTS

Members of the Data Processing Curriculum Committee:

Norman Blain (Chairperson)
Sturgeon Creek Regional Secondary School
St. James-Assiniboia School Division No. 2

Al Fisher
Manager, Accounting
Richardson Securities

George Porozny
Faculty of Education
University of Manitoba

William Siwak
Shevchenko Collegiate
Boundary School Division No. 16

Glen Slater
St. John's High School
Winnipeg School Division No. 1

William Vandurme
Dakota Collegiate
St. Vital School Division No. 6

Consultants to the Committee:

H. Marshall Draper
and
Isabella Dryden
Curriculum Development and Implementation Branch
Department of Education

The Department would like to thank the following people for their contributions to the development of support materials, made available through the Department of Education:

Beryl Bingham, Elmwood High School, Winnipeg School Division No. 1
Norman Blain, Sturgeon Creek Regional Secondary School, St. James-Assiniboia School Division No. 2
Glen Slater, St. John's High School, Winnipeg School Division No. 1

The Department would also like to thank Beryl Bingham of Elmwood High School, Winnipeg School Division No. 1, for her assistance in reviewing and identifying resources for this guide.

TABLE OF CONTENTS

Rationale 1

Evaluation 1

Time Allotment 1

Goals and Objectives

- Data Processing 202 2
- Data Processing 302 3

Data Processing 202

- Historical Development and Orientation 7
- Computer Technology in Business 23
- Communication of Information 39
- Processing Data on a Computer System 44
- Problem Solving and Flowcharting 50
- Programming 53
- Introduction to Computer Business Applications 59
- Bibliography 61

Data Processing 302

- Review and Programming 69
- Business Applications 78
- Bibliography 94

Transparency Masters

RATIONALE

Data Processing 202 and 302 have been designed to introduce students to data processing principles, concepts, and practices important to both personal and business life; to promote the development of data processing business skills and applications for job-entry-level positions; and to provide an introduction to business data processing concepts and procedures studied at the post-secondary level.

Data Processing 202 is the introductory course in data processing. It emphasizes basic data processing concepts and principles related to business uses and applications of computers, computer technology, data communication systems, processing of data on a computer system, problem solving and developing flowcharts, introductory programming and computer business programming and applications. Data Processing 302 is a follow-up to Data Processing 202, and focuses on additional programming theory and computer business programming applications.

The courses are useful to vocational business education students and to any other students who wish to acquire a knowledge of business data processing for personal use or as a foundation for further educational/vocational development.

Data Processing 202, 302 should be studied in conjunction with Accounting 202 and Typewriting 102 in particular, as well as with the following courses: Accounting 302, Typewriting 202, 302, Office Procedures 302, General Business 101, Retailing 102, Relations in Business 202, Management 302, and electives from Business Principles 201, Law 302, Economics 301. Students should be encouraged to study core subjects (mathematics, English, sciences, social studies) at the level most appropriate to the individual.

EVALUATION

The evaluation of student achievement should be closely related to the objectives of the curriculum and should be influenced by vocational standards. Students should be tested frequently through the use of objective tests, essay-type questions, essays, reports, projects, and various types of class assignments.

TIME ALLOTMENT

Data Processing 202 and 302 are one-credit courses in secondary schools, and each requires 110-120 hours of instruction.

DATA PROCESSING 202

I. Historical Development and Orientation - 10%

The student should be able to:

- understand the basic definition of a computer;
- understand the historical development of computing devices/computers;
- collect information about the historical development of computing devices/computers;
- appreciate the evolution of computing devices/computers;
- understand the basic definition of data;
- define data processing;
- explain the relationship between data and data processing;
- recognize the historical perspectives of the concept of data processing;
- recognize the importance of terminology when communicating about data processing;
- identify vocabulary related to computers/data processing;
- define terminology for computers/data processing;
- recognize the impact of computers and data processing on society;
- develop an awareness of ethical considerations related to computers and data processing;
- identify the positive and negative consequences of computers;
- assess the positive and negative effects of computers;
- appreciate the proper utilization of technology;
- develop an awareness of classifications of occupations;
- understand classifications of occupations;
- identify and describe common computer-related career categories;
- identify and describe business computer careers;
- recognize that computers and computer-supported applications are used in a variety of ways to assist individuals, groups, and institutions;
- identify specific uses of computers and computer-supported applications;
- identify computer-controlled devices.

II. Computer Technology in Business - 25%

The student should be able to:

- recognize the relationship of computer technology to business;
- collect information about the use of computers in business;
- assess the influence of computers on business;
- define system;
- describe a computer system;
- define hardware;
- recognize hardware components;
- define software;
- classify software;
- explain the purpose of software;
- identify the components of a computer system;
- recognize the categories of computers;
- define memory;
- identify the acronyms for the different types of memory
- explain the purpose of each type of memory;
- develop an awareness of the implications of computers for employers, employees, business, and industry;
- understand the implications of computers for employees;
- recognize the implications of computers in industry;
- describe the implications of computers in business and industry;
- recognize the impact of computer technology on types of industries and on firms in each industry.

III. Communication of Information - 5%

The student should be able to:

- define communication;
- identify the purpose and importance of communication;
- recognize the conditions essential to effective communication,
- identify and explain the communication cycle;
- explain the methods of communication;
- identify and assess the internal and external voice (audio) communication media;

- identify and assess the internal and external written communication media;
- describe data communication systems;
- identify the purpose of data communication systems;
- recognize the relationship of accuracy to communication and data communication systems.

IV. Processing Data on a Computer System - 15%

The student should be able to:

- describe the purpose of data files;
- understand the need for organization of data files;
- identify the types of file media;
- compare the types of file media;
- recognize the relationship between data organization and computer operation;
- identify the logical entities for organizing data;
- recognize the purpose of the data processing cycle;
- identify the basic components of the data-processing cycle;
- describe the purposes of the basic components of the data processing cycle;
- explain the relationship of the data processing cycle to data files;
- identify the basic processing concepts;
- identify the data processing functions;
- define and explain the purpose of the data processing functions;
- define the term program;
- describe the concept of a stored program;
- explain the process of submitting data to a computer;
- identify and use system commands;
- explain and differentiate between batch and interactive processing.

V. Problem Solving and Flowcharting - 10%

The student should be able to:

- outline a model for problem solving;
- explain the need for a problem-solving model;
- define flowcharting;
- explain the purpose of flowcharting;
- identify and use flowcharting symbols;
- use flowcharting to solve problems;
- prepare program flowcharts;

- prepare systems flowcharts;
- compare program and systems flowcharts.

VI. Programming - 20%

The student should be able to:

- define programming;
- define computer program;
- identify the steps in the program development cycle;
- explain the purpose of a program;
- define programming language;
- explain the purpose of a programming language;
- describe the most widely used programming language,
- explain the historical development of programming languages;
- describe the development of BASIC;
- explain the purpose of the following BASIC commands: REM, END, LET, PRINT, GO TO, IF, READ, DATA, FOR/NEXT, DIM;
- explain the rules for writing BASIC statements;
- code and run programs illustrating the use of the following BASIC commands: REM, END, LET, PRINT, GO TO, IF, READ, DATA, FOR/NEXT, DIM;
- identify and explain the procedures for using a terminal/computer;
- code and run programs to solve simple business problems.

VII. Introduction to Computer Business Applications - 15%

The student should be able to:

- explain how businesses use computer programs to solve problems;
- identify computer application criteria;
- use pre-written packaged programs to simulate business applications.

DATA PROCESSING 302

I. Review and Programming - 30%

The student should be able to:

- apply the concepts, skills, and objectives of Historical Development and Orientation;

- apply the concepts, skills, and objectives of Computer Technology in Business;
- use the skills and apply the concepts and objectives of Communication of Information;
- apply the concepts, skills, and objectives of Processing Data on a Computer System;
- use the skills and apply the concepts of Problem Solving and Flowcharting;
- apply the introductory theory and skills for programming and programming languages;
- use the skills and apply the concepts of Introduction to Computer Business Applications;
- explain the purpose of the ten BASIC commands from Data Processing 202;
- code and run business programs using the ten BASIC commands from Data Processing 202;
- recognize the need for additional BASIC commands;
- explain the purpose of the following BASIC commands: GO SUB, RETURN, ON, INPUT, PRINT USING, IMAGE, TAB;
- code and run business programs using BASIC commands;
- define bug and debugging;
- identify the forms of errors;
- debug programs;
- describe the nature, advantages, disadvantages, and uses of COBOL, PASCAL, FORTRAN, and/or other languages;
- compare COBOL, PASCAL, FORTRAN, and/or other languages;
- read and explain programs written in other languages, preferably COBOL.

II. Business Applications - 70%

The student should be able to:

- recognize the applications of computers in modern business;
- identify business applications of computers;
- explain the characteristics of the accounting systems;
- identify the phases of a data processing system for accounting applications;
- explain the purpose of mailing, address, and membership lists;
- describe the structure and content of mailing, address, and membership lists;
- run a mailing, address, or membership list program and produce output;
- define payroll;
- explain the purpose of a payroll system;
- describe the structure and content of a payroll system;
- explain the procedure for computerizing a payroll system;
- run a payroll program and produce output;
- define accounts receivable;
- explain the purpose of an accounts receivable system;
- describe the content and structure of an accounts receivable system;
- identify the basic procedures for accounts receivable systems;
- explain the procedure for computerizing an accounts receivable system;
- run an accounts receivable program and produce output;
- define accounts payable;
- explain the purpose of an accounts payable system;
- describe the content and structure of an accounts payable system;
- identify the basic procedures for accounts payable systems;
- identify the output from accounts payable systems;
- explain the procedure for computerizing an accounts payable system;
- run an accounts payable program and produce output;
- define inventory;
- recognize the various types of inventory systems;
- explain the purpose of an inventory system;
- describe the content and structure of an inventory system;
- identify the basic procedures for inventory systems;
- identify the output from inventory systems;
- explain the procedure for computerizing inventory systems;
- run an inventory system and produce output;
- define general ledger;
- explain the purpose of a general ledger system;
- describe the structure and content of a general ledger system;
- identify the procedure for computerizing general ledger systems;
- run a general ledger program and produce output;
- recognize other business applications;
- explain the purpose of the business applications;
- describe the structure and the content of the business applications;
- run a program and produce output for the business applications.

data processing 202

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
I. HISTORICAL DEVELOPMENT AND ORIENTATION - 10%	NOTE: Students who have a credit in a computer literacy course may prepare a comprehensive research report/project if they have completed a study of the content identified in the section HISTORICAL DEVELOPMENT AND ORIENTATION.	
	Have the students prepare and maintain an indexed notebook and a scrapbook and/or a vertical file during the study of Data Processing 202. Discuss the purposes of maintaining a well-organized notebook. Encourage the students to include the following in the notebook project: notes, sketches, illustrations, diagrams, articles from periodicals, instruction sheets and other materials related to Data Processing.	PURPOSES OF NOTEBOOK PROJECT 1. To provide a record of learning and progress 2. To develop a storehouse of information for present and future reference
	Establish a computer/data processing reference corner/shelf in the classroom and/or acquaint the students with the references in the school library. Encourage the students to use the references to complete computer/data processing projects to enrich their knowledge and to enhance their appreciation of computers and data processing.	MATERIALS FOR REFERENCE AREA 1. Textbooks 2. Reference Books 3. Dictionary of Data Processing 4. Periodicals 5. Audio-Visual Materials: films, filmstrips, slides, cassettes, video tapes, transparencies
A. History of Computers and Data Processing The student should be able to: 1. understand the basic definition of a computer;	Show the students or have the students bring to the classroom illustrations of various types of computers. Have the students prepare and discuss written definitions of a computer. Encourage the students to research library references/textbooks to aid in the preparation of a definition of the term computer. Prepare or have the students prepare an organized bulletin board display to illustrate the different types of computers.	DEFINITIONS OF A COMPUTER 1. An information-handling device, which is largely automatic 2. An electronic device that uses stored data and instructions to generate information 3. An electronic device which performs computations and logical operations

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		4. A device which can perform arithmetic and logic operations without intervention by a human being The Computer (colour filmstrip, cassette, guide) Prentice-Hall Media Posters on Mathematical Machines, J. Weston Walch, Publisher BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Ltd., Chapter 1 The World of Computers and Information Processing, John Wiley and Sons, Chapter 1 Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapters 1-2 Programming in BASIC: A Complete Course, Holt, Rinehart and Winston of Canada, Limited, Chapter 1 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapter 2 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1-2 Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Company, Chapter 1
2. understand the historical development of computing devices/computers;	Emphasize the following: the pre-computer developments, the development of computer hardware, the role of computer software in the historical development; the contributions by individuals and companies in the evolution of computers. Point out that the first computer was the human brain. Explain that the human brain and a computer can handle information by receiving it, giving it out, storing data and instructions, and making calculations.	

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
3. collect information about the historical development of computing devices/computers;	Acquaint the students with the evolutionary steps in the development of computing devices/computers. Have the students relate the collection/storage of information to the following evolutionary steps: a) pre-computer aids: cave painting to record information; stone counting by early shepherds; finger counting by Romans; Stonehenge, a prehistoric machine that captured the various religious, agrarian, and scientific aspects of Neolithic society; b) abacus: near East and China 2000 years ago; Japan and the Soroban abacus; c) manual record keeping: devised by the early civilizations of Babylon, Egypt, Greece, Rome, and England; d) development of written calculations in form of tables; e) invention of Napier's Bones by John Napier; f) early calculators: first mechanical adding machine invented in 1642 by Blaise Pascal; first calculator to add, subtract, multiply, and divide, built by Gottfried Wilhelm Von Leibnitz in 1694; g) early American inventors: first calculator in United States in 1872 by Frank Baldwin; beginning of the punched card to speed sorting and tabulating of census data in United States in 1880 by Herman Hollerith; organization in 1896 by Herman Hollerith of the Tabulating Machine Company, later known as International Business Machines/IBM; development of key punching machine, a sorter and a tabulator by James Powers; organization by James Powers of the Powers Accounting Machine Company, later known as Remington Rand Corporation;	The Thinking??Machine (film), Manitoba Telephone System, Public Relations Department Annals of the History of Computing (periodical), American Federation of Information Incorporated Societies, Inc. "Stonehenge--the First Computer," Data Management, October, 1981 ABACUS: An early computing device on which numbers are represented by the pattern of beads on a number of rods How Computers Work (filmstrip, cassette), Encyclopedia Britannica Corporation Computers: From Pebbles to Programs (filmstrips, cassettes, teacher's guide), Guidance Associates Introduction to Computers and Information Processing, Reston Publishing Company, Inc., pp. 13-14 The Computer Establishment, Harper and Row

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	h) pre-commercial computers: Difference Engine in 1822 by Charles Babbage, father of modern computers; Mark I, Automatic Calculator, in 1944 by Howard H. Aiken; ENIAC, Electronic Numberical Integrator and Computer in 1945 by J. Prosper Eckert and Dr. John Mauchley; EDVAC, Electronic Discrete Variable Automatic Computer, in 1945 by Dr. John Von Neumann; i) commercial computers: first generation 1950-1957, second generation 1959-1964, third generation 1965-1969, fourth generation 1970-1980; j) recent developments. Have the students prepare a chart, timeline, booklet, bulletin board display, or collage, to record significant developments related to the evolution of computing devices or computers. Encourage the students to obtain resource materials on computers and about individuals and companies who contributed to the evolution of computers. Have the students prepare reports complete with table of contents, title page, and bibliography of resources.	Introduction to Computers and Information Processing, Reston Publishing Company, Inc., pp. 17-21 FIRST GENERATION COMPUTERS: Computers built during the period of UNIVAC I to the late 1950's SECOND GENERATION COMPUTERS: Computers featuring solid transistors, built during the period of 1959-1964 THIRD GENERATION COMPUTERS: Computers containing microprocessors, built during the period of 1970-1980 FOURTH GENERATION COMPUTERS: Computers containing microprocessors, built during the period of 1970-1980 FIFTH GENERATION COMPUTERS: Computers with voice communication in process of being built Horizon: Now the Chips are Down (film), BBC Enterprises The Micro-Electronic Revolution (video recording and viewer's guide), Fast Forward I Series The History of the Computer (filmstrip, cassette), Encyclopedia Britannica Corporation

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Search for or have the students search for computer-related materials to enhance classroom instruction and to include as part of a historical display on computer developments. Encourage the students to make this an on-going project for Data Processing 202.	COMPUTER-RELATED MATERIALS Abacus Analog devices (supermarket click counters) Computer control unit/automated device (burglar alarm) Computer tape Circuit boards (TV sets, radios) Digital calculator Disc packs Vacuum tube Transistor Integrated solid state circuit Slide rule Digital watch parts Punch paper tape Templates
4. appreciate the evolution of computing devices/computers;	Discuss and point out that the following developments influenced the evolution of computing devices and computers: a) performing calculations by machines; b) storing data in machine-readable form; c) storing programs within a machine; d) need for rapid data processing. Through discussion and research, relate the evolution of computing devices and computers to developments and applications in business. Make the students aware of the advantages and limitations of computing devices and computers. Discuss how electronic data processing got started and the rapid changes which have taken place. Encourage the students to work on an in-depth research project to prepare an illustrated report on the relationship between business developments and applications, and the stages of computer evolution.	"History of Computers," Data Management, October 1981 Transparencies for Introduction to Data Processing, 2nd ed., Gage Publishing The World of Computers and Information Processing, John Wiley and Sons Introduction to Computers and Data Processing, Anahelm Publishing Company

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
5. understand the basic definition of <u>data</u>;	Through discussion, reading, and research, have the students define the term <u>data</u> and give examples of various types of data. Explain that information is the meaning or understanding that can be obtained from data if the necessary rules for interpretation are available. Discuss the following: a) a sequence of data (symbols) may have no meaning and therefore no capacity to convey information because the necessary rules are unknown; b) the same data may change meaning because the rules have changed; c) the information content of data can be measured; d) the information will be greater if there are many possibilities from which data are selected and less if there are fewer. Point out that data form the bases for data processing and computer operations.	<u>DEFINITIONS OF DATA</u> 1. Facts or information 2. Bits of information, facts in unprocessed form 3. Unstructured facts 4. Information used by a person or a machine computing device or computer 5. Values or variables used in computer programs 6. Any and all information, facts, numbers, letters, symbols, etc., which can be acted upon or produced by a computer 7. Any representations such as characters or analog quantities to which meaning is or might be assigned 8. A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, and processing by humans and machines
6. define <u>data processing</u>;	Review the definition of <u>data</u>. Explain that data are information; processing is handling; and that data processing, is, therefore, the handling of information. Discuss the nature of data by making the students aware that data attempt to represent information with reasonable accuracy, but that data are often inadequate for the following reasons: a) the rules for interpretation may not be defined; b) the rules may be inadequate for the required task; c) the data may contain mistakes; d) the significance of the data and the rules for interpretation may change, or there may be several sets of rules;	<u>DEFINITIONS OF DATA PROCESSING</u> 1. Handling information 2. Converting facts or information into usable form 3. Handling information or data with a minimum of human effort and intervention 4. Manipulating facts about business operations in order to prepare useful information. 5. Recording, sorting, calculating, summarizing, communicating, storing, and retrieving of information or data of all kinds

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	e) the same data may be interpreted differently by people with different personalities or beliefs; f) data can be interpreted in many different ways.	6. Performing a systematic sequence of operations upon data 7. Applying computers to the processing of information related to the operation of business
	Have the students list the kinds of information processed by computers for businesses. Ask them to locate examples of and prepare bulletin board displays about business data processing: telephone, electricity, and gas bills; form letters, cheques; invoices; statements of accounts; and other examples.	
	Point out that two major types of data are processed: business and scientific. Emphasize that research indicates that 90 per cent of all data that are processed are of a business nature and that data processing is big business. Explain that businesses of all types spend large sums of money on data procurement, and that the costs of getting data are small compared to the costs of working with inadequate or inaccurate data.	Introduction to Computers and Data Processing; Transparency Masters, Figures 2-23 and 2-26, Anaheim Publishing Company
7. explain the relationship between data and data processing;	Review the definitions and examples of data and data processing. Point out that data processing deals primarily with raw data, and that through computer processing, information becomes usable and helpful to business. Emphasize that the computer is an important tool which inputs business data; analyzes data using arithmetic operations and logic; and outputs the analyses in the form of reports, tables, and summaries that individuals can use to make decisions about the future. Compare the functions of the human brain to the functions of the computer in the processing of data.	TYPES OF BUSINESS DATA 1. Sales 2. Payroll 3. Inventory 4. Accounts Receivable 5. Accounts Payable 6. Interest Calculations 7. Analysis of Markets 8. Schedules of Transportation 9. Other
	Discuss with students the use of data processing in familiar situations such as in schools, part-time employment, shopping, transportation, medicine, banks, libraries, etc. Make the students aware of the global nature	

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	of business and business data processing. Encourage them to discuss, debate, and prepare a report on the following: "The Use of Data to Help All Nations Build Better Lives Through Trade and Investment."	
8. recognize the historical perspectives of the concept of data processing.	Discuss and have the students collect information about the types of data and the methods of processing the data as related to each of the evolutionary steps of computing devices/computers. Point out that changes in consumer tastes and needs, shocks such as the energy crisis, shifts in political and economic conditions throughout the world require rapid responses by business. Explain and ask the students to collect information about the types of data and the methods of processing the data as related to each of the evolutionary steps of computing devices and computers. Encourage students to prepare illustrated time lines or reports linking the historical developments of data and data processing to the evolution of each type of computing device or computer.	The Silicon Factor (film), BBC Enterprises Goodbye Gutenberg (film), BBC Enterprises Memory and Storage (video recording and viewer's guide), Fast Forward I Series
B. Computer/Data Processing Terminology	Integrate computer/data processing vocabulary throughout Data Processing 202 and 302. Introduce and discuss the vocabulary requisite and applicable to each topic in the curricula. Provide the students with opportunities to become familiar with the action words of data handling, for instance: origination of data, recording data, collecting data, classification of data, sorting data, calculating data, storing data, summarizing and reporting data, and communicating data.	Computer Dictionary, Howard W. Sams and Company
The student should be able to:		
1. recognize the importance of terminology when communicating about data processing;	Emphasize that understanding computer/data processing terminology is important to communication about and understanding of data processing.	Data Processing Terminology (colour filmstrips, cassettes, program guide), Prentice-Hall Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Computer Terminology, Beginning Level (filmstrip/slide set/videotape), AIM Educational Aids Computer Terminology, Advanced Level (filmstrip/slide set/videotape), AIM Educational Aids
2. identify vocabulary related to computers/data processing;	Encourage students to read about computers and data processing; to prepare lists of words related to computers/data processing; and to use the words to convey information about data processing.	The World of Computers and Information Processing, John Wiley and Sons, pp. 395-402 (glossary)
3. define terminology for computers/data processing.	Discuss the terminology for computers/data processing, using illustrations. Have the students build a vocabulary list complete with definitions as an on-going project for Data Processing 202 and 302.	Introduction to Computers and Information Processing, Reston Publishing Company, Inc., pp. 496-515 (glossary) Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, pp. 412-418 (glossary of special terms) Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. I.1-I.2 (glossary/index)
C. Computers and Society The student should be able to:		
1. recognize the impact of computers and data processing on society;	Emphasize the influence of computers and data processing on society. Discuss and have the students prepare lists, reports, and oral presentations of the ways in which the lives of individuals/nations have been and are being affected by data processing. Explain and have the students research information and prepare reports or lead a discussion on the business uses of computers for payroll, general ledger, accounting, billing, inventory, sales analysis, auditing tax returns, information and reservation systems, and other business activities and records. Identify and describe the following diverse computer/data processing applications: weather forecasting,	INFLUENCE OF COMPUTERS/COMPUTING DEVICES AND DATA PROCESSING ON DAILY LIFE 1. Digital alarm clock/radio 2. Computer typesetting of daily newspaper 3. Bills produced by computer (gas, oil, telephone, water, periodicals) 4. Design and manufacture of cars (schedules for parts and labour, fuel injection devices, cruise control) 5. Traffic lights/controls 6. Driver's licence and record

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	medicine, security systems, language translation, classroom instruction, and others.	7. Class schedules and student records 8. Book orders and library catalogues 9. Computerized cash registers 10. Travel reservations 11. Bank records 12. Other Electronic Medicine (video recording and viewer's guide) Fast Forward 1 Series Computers in Society, 3rd ed., McGraw-Hill Book Company
2. develop an awareness of ethical considerations related to computers and data processing;	Define ethics and discuss the relationship of ethics to computers, data processing, and the data processing profession. Make the students aware of and discuss the Code of Ethics for Computer Professionals. Emphasize the following sections of the Code: Code of Conduct and Code of Good Practice. Have the students write, check, and discuss the Attitude Test for Ethics in Data Processing. Relate the test to the Code of Ethics for Computer Professionals.	ETHICS: The standard of moral conduct practiced within the profession Security (videotape, viewer's guide), Fast Forward 2 Series BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Limited, pp. 374-375 All About Data Processing, J. Weston Walch Introduction to Computers and Data Processing:Transparency Masters, Anaheim Publishing Company, Figure 13-2 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 13
3. identify the positive and negative consequences of computers;	Explain and have the students locate information about the positive and negative consequences of computers and their use. Make the students aware of some of the concerns related to technology and encourage them to present contra statements based on research and information.	Horizon: Now the Chips Are Down (film), BBC Enterprises CONCERNS ABOUT TECHNOLOGY 1. Obsolescence/replacement of people 2. Exploitation of people 3. Invasion of privacy 4. Threat of technology

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		5. Dependence on technology 6. Generation of too much information 7. Depersonalization of people 8. Time consuming vs opportunity cost
4. assess the positive and negative effects of computers;	Discuss or have the students debate and/or report on the implications of computers for each of the following: cashless society, employment increase and decrease, productivity, economic power, social and political power and developments, crime commission, and detection. Encourage the students to analyze specific computer innovations and to point out possible uses and misuses. Identify some advantages and disadvantages of data banks of personal information on individuals and large numbers of people. Emphasize the relationship of personal information to research. Discuss the potential misuses of computer technology and its consequences for individual freedom, and identify possible areas of value conflict. Review the sections of the Code of Ethics for Computer Professionals which apply to individual freedom/privacy.	Implications (video recording and guide), Fast Forward 2 Series The Computer (filmstrip, cassette, guide), Prentice-Hall Media VALUES OF COMPUTERS FOR SOCIETAL AND INSTITUTIONAL NEEDS 1. Making full, accurate information available for relevant decisions, problem solutions, inquiries by private individuals and businesses 2. Handling routine data collection/processing/monitoring tasks efficiently BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Ltd., Chapter 20
5. appreciate the proper utilization of technology.	Discuss and/or have the students research information about how technology can be used to assist people without hurting society and the environment. Encourage the students to speculate about future uses of computer technology in society and the environment.	Humanized Technology (video recording and viewer's guide), Fast Forward 1 Series New Perspectives (video recording and viewer's guide), Fast Forward 1 Series Implications (video recording and viewer's guide), Fast Forward 2 Series

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
D. Employment and Careers The student should be able to:	Integrate information and learning activities about career and employment opportunities as well as post-secondary education throughout Data Processing 202 and 302.	
1. develop an awareness of classifications of occupations; 2. understand classifications of occupations;	Emphasize that vocational choices related to data processing will depend on personal skills, knowledge, interest, and initiative as well as employment opportunities and types of training/education available. Encourage the students to extract pertinent information about the classifications of occupations from The Canadian Classification and Dictionary of Occupations and Training Manual for Canadian Classification and Dictionary of Occupations, Volume I.	The Canadian Classification and Dictionary of Occupations, Department of Manpower and Immigration, Canada Training Manual for Canadian Classification and Dictionary of Occupations, Volume I, Department of Manpower and Immigration, Canada
3. identify and describe common computer-related career categories;	Have the students research, and then prepare lists of computer-related career categories, identifying the requisite educational background for each category. Emphasize the value of computer knowledge/skills for employment and careers. Stress the importance of personal aptitudes and attitudes as well as academic requirements necessary for the various computer-related career categories.	COMPUTER-RELATED CAREER CATEGORIES 1. Data Entry--Clerical 2. Computer Programmer 3. Systems Analyst 4. Computer Operator 5. Systems Software Programmer 6. Hardware Specialist Programming Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media Data Processing Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media Hardware Development and Service Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Peripheral Careers, (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media Introduction to Computers and Data Processing Transparency Masters, Figure 2-21, Anaheim Publishing Company Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, Chapter 15 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., pp. 489-491
4. Identify and describe business computer careers.	Classify and explain computer careers related to the following aspects of business: operations, applications, plant, and staff. Ask the students to select occupations related to data processing in business and explore the requirements for employment. Have the students identify tasks related to business computer careers and collect information about entry- and advanced-level occupations. Encourage the students to plan for and work on the following on-going project: collection of want ads for the computer/computer-related employment; attachment of ads to 8 1/2 x 11" paper, preparation of job description, educational requirements, and other information based on the want ads and additional resource material. Plan field trips to business data processing centres to discover the roles of entry- and advanced-level employees. Invite guest speaker/s from financial institutions, government offices, military organizations, and private businesses to talk about attitudes, education, and employment opportunities pertinent to business computer careers. Encourage the students to prepare a chart/poster	The Computer Revolution (colour filmstrip, cassette, guide), Prentice-Hall Media Occupational Analyses Series, Employment and Immigration Canada BASIC Computing:A Complete Course, McGraw-Hill Ryerson, Ltd., Chapter 23 Exploring Data Processing Careers, South-Western Publishing Company DATA PROCESSING JOB TITLES 1. Applications Engineers 2. Card-to-Tape Converter Operator 3. Coding Clerk 4. Computer Engineer 5. Computer Operator 6. Computer Service Technician

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	entitled: Data Processing Career Ladder.	7. Computer Peripheral Equipment Operator 8. Control Clerk, Data Processing 9. Customer Service Engineer 10. Data Entry Operator 11. Data Typist 12. Field Service Technician 13. Manager, Electronic Data Processing 14. Operations, Research Analyst 15. Printer Operator 16. Programmer, Business 17. Programmer, Detail 18. Programmer, Engineering and Scientific 19. Project Director, Data Processing 20. Supervisor, Computer Operations 21. Supervisor, Data Processing 22. Systems Analyst 23. Systems Engineer 24. Tape Librarian 25. Others
E. Uses and Applications of Computers The student should be able to: 1. recognize that computers and computer-supported applications are used in a variety of ways to assist individuals, groups, and institutions;	Discuss and have the students collect information from various sources for the preparation of oral/written reports, complete with visual aids, to explain and illustrate ways in which computers and computer-supported applications can assist individuals, groups, and institutions. Point out that writing is a learning strategy, a way of arriving at and stimulating learning. Use the "what if" type of writing assignment to help students bridge the gap between the	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 2

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	known and unknown about computers and data processing.	
2. Identify specific uses of computers and computer-supported applications;	Encourage the students to develop an indexed classroom scrapbook/vertical file of newspaper and periodical articles about the uses of computers and computer-supported applications. Integrate as an on-going class reference project for Data Processing 202 and 302. Have the students prepare bulletin board displays, posters, transparencies, slides and other media to illustrate the uses of computers and computer-supported applications. Request the students to prepare a scrapbook or a bulletin board display of computer cartoons entitled, Cartoon of the Week, as an on-going project.	USES OF COMPUTERS AND COMPUTER-SUPPORTED APPLICATIONS 1. Medicine and health care 2. Law enforcement and criminal justice 3. Education and training 4. Engineering and design 5. Business and banking 6. Office 7. Transportation and traffic control 8. Defense systems 9. Weather prediction 10. Recreation 11. Government and politics 12. Home 13. Library 14. Manufacturing 15. Creative arts 16. Publishing 17. Public utilities (telephone, power plants) 18. Libraries 19. Agriculture 20. Others
	Point out that computers are generally useful for information-processing tasks which require any of the following: a) handling of large amounts of data and information; b) processing of data and information rapidly; c) dealing with repetitive tasks; d) processing data and information accurately; e) storing of data and information in an accessible form; f) communicating information. Relate these information-processing tasks to	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 2, 3, and 9 Instructor's Guide and Answer Manual to Accompany Introduction to Computers and Data Processing, Anaheim Publishing Company, p. 2.10 "Ottawa Makes Tilden Pledge," MICROS Journal, May 1981

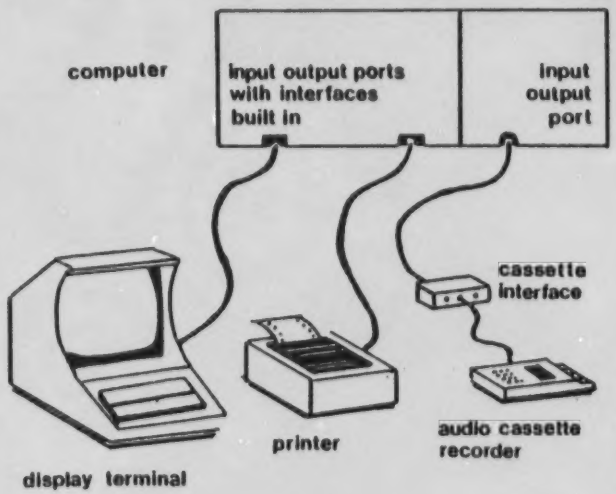
GOALS AND OBJECTIVES	TEACHER'S NOTES AND ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	the uses of computers and computer-supported applications. Explain that automated information processing is a logical extension of the manual one-write system. Indicate that the advantage of electronically stored data is that the data can be retrieved from memory many times and used in a variety of ways; this is not true of the manual one-write system. Point out that while data are processed once, they can be and often are retrieved over and over again for many different purposes.	"Increasing Productivity Through the Use of Computers," Monitor, April/May/June 1981 "Library Applications of Micro-Computers," Monitor, August 1981 "Computers Track Tractors as Deere Builds Them," Data Management, November 1981 "Forms Design No Simple Task for Busy Ford Truck Dealer," Data Management, November 1981 "Backbone for GM Parts Warehousing/Distribution is Honeywell 66/80," Data Management, November 1981 "Teller in the Supermarket," Data Management, July 1980
3. identify computer-controlled devices.	Discuss, describe, and have the students prepare a list, a bulletin board display, a collage or a report of the use of computer-controlled devices.	EXAMPLES OF COMPUTER-CONTROLLED DEVICES 1. Calculators 2. Cars 3. Robots 4. Thermostats 5. Watches 6. Toys 7. Pens 8. Radios 9. Clocks 10. Microwave ovens 11. Kitchen blenders 12. Colour TV 13. Electronic typewriters 14. Copiers 15. Others

GOALS AND OBJECTIVES	TEACHER'S NOTES AND ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
II. COMPUTER TECHNOLOGY IN BUSINESS - 25% A. Overview of Computers in Business 1. recognize the relationship of computer technology to business;	Emphasize the following during class discussions to develop, to increase, and to assess student awareness of the relationship of computer technology to business: a) business applications remain the primary use of automated data processing; b) business requires computers to analyze sales, to keep track of payroll data and withholding taxes, to invoice customers, to list and cost inventory, and to calculate and solve many business problems occurring daily in government and private enterprises.	Periodicals Newspapers Television programs BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Ltd., Chapters 13, 14, 15 Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapters 17, 18, 19, 20, 21, 22
2. collect information about the use of computers in business;	To stimulate research and the collection of information by the students for the preparation of assignments, relate the discussion about computer use to the following businesses and their information requirements: a) insurance company (list of policyholders, payment of premiums, commission of salespersons); b) trucking company (location of trucks, inventory of trucks, payment of accounts, billing customers); c) railroad company (inventory of cars, location of cars); d) tool manufacturing company (list of types of tools in warehouse). Ask the students to consider these questions as they pertain to computers and various types of businesses: 1. Does a car rental company want to keep accurate records of who rents its cars,	Examples of computer printouts The Computer Revolution (colour filmstrip, cassette, program guide), Prentice-Hall Media Examples of business computer forms and reports

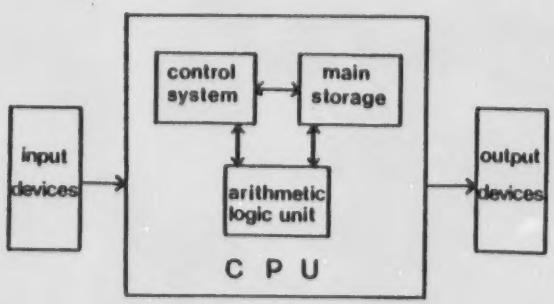
GOALS AND OBJECTIVES	TEACHER'S NOTES AND ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	where and when the cars are to be returned? How? Why? 2. Does a province want a record of automobile licences? Voters? Telephone users? For what purposes? What type of information? 3. Does a city/municipality require lists of homeowners? Taxpayers? How and why? 4. Does an airline need information about hours of service of aircraft? The seats available on various flights? Why? 5. Does a company require a record of employee pay scales? Vacation schedules? For what reasons? What type of information? 6. Does a retail store require information about products that sell well? Why? 7. Does a stock exchange require computer reports? 8. How would a zoo use a computer locally, provincially, nationally, and internationally? Encourage the students to list other businesses and the ways in which they use or may use computers.	
3. assess the influence of computers on business.	Make the students aware that the need for data and information has become the lifeblood of the various business activities in modern civilization. Emphasize that without a quick, sure, accurate way of processing business data, the standard of living could deteriorate. Have the students debate the foregoing statement.	The Business of Information (video recording, articles) Fast Forward 2 Series
B. Hardware and Peripheral Equipment The student should be able to: 1. define system;	Discuss and have the students write a definition for system. Point out that a series of operations and procedures performed by people and machines on business data constitutes a business data system. Indicate that any system related to the processing of data involves an interdependence of people and	DEFINITIONS OF SYSTEM 1. An organized collection of people, machines, and methods required to accomplish a specific objective 2. A series of related human

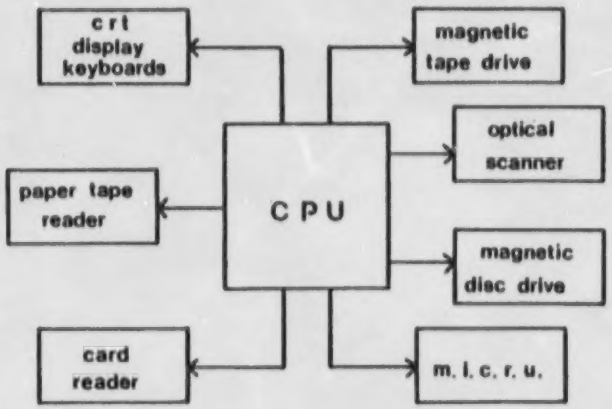
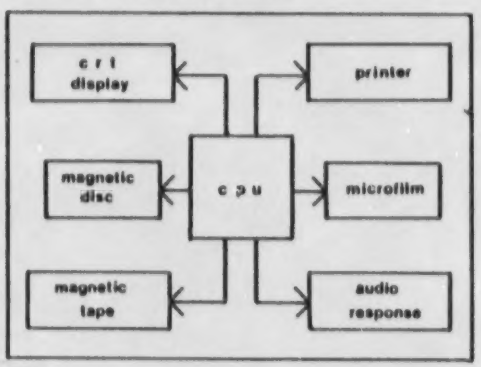
GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	machines. Have the students give examples of various types of business data systems.	and/or machine operations performed to do a complex task 3. A series of related procedures designed to perform a specific task 4. An organized collection of hardware and software that works together
2. describe a computer system;	Explain that a computer plays an important part in processing data in a computerized system. Discuss and define the term computer system. Point out the need for a computer system for business data processing. Emphasize that a computer system includes both hardware and software which must work together to process various types of business data. Discuss the following tabulation: COMPUTER SYSTEM Hardware Components ⟷ Software Components 1. Input devices 2. Central processing unit 3. Output devices 1. Programs for systems 2. Programs for applications Point out that hardware and software are analogous to stereo systems and records respectively. Have the students collect information about the unique characteristics of a computer system.	DEFINITIONS OF A COMPUTER SYSTEM 1. A central processor and its input and output devices 2. A CPU (central processing unit) with various devices hooked up to it, such as tapes, discs, and printer, connected together to form an entire unit 3. The hardware and software components which must function together in order that a computer will process data into information Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1, 3, and 10 BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Ltd., Chapter 15 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapters 1, 5-10 Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapters 2-6

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Introduction to Computers: The CPU (colour filmstrips/slides/ video tapes and audio cassettes), AIM Educational Aids The Computer (colour filmstrip/ cassette, guide), Prentice-Hall Media
3. define hardware;	Have the student read textbooks, reference books, periodicals, newspapers, and brochures from manufacturers of computers to locate and discuss information for a definition of hardware.	DEFINITIONS OF HARDWARE 1. Nuts and bolts of the computer 2. Actual machinery of computer 3. Mechanics and circuitry of the computer 4. Physical equipment or components in an electronic computer system 5. Physical part of the computer (such as CRT, CPU, memory, etc.) as opposed to software 6. All the electrical and mechanical parts that make up a computer system
4. recognize hardware components;	Identify and explain the following components: keyboard, screen (cathode-ray tube), central processing unit, printers, and discs. Point out that printers, discs, and other hardware attached to the computer are usually referred to as peripheral equipment. Explain that a computer is linked to peripheral devices by way of an input/output port and an interface. Indicate that the interface functions in much the same way as an interpreter at a conference, by changing the signals received from a device into a form useable by the computer and vice-versa.	Computer Hardware (colour filmstrip, cassette, guide), Prentice-Hall Media Bulletin board display of hardware components TNW--1000 Serial interface attachment for PET Commodore computer to connect the PET to a serial printer (e.g., printer for the Manitoba Schools Network)

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	 COMPUTER LINKED TO PERIPHERAL DEVICES BY WAY OF INPUT/OUTPUT PORT AND A SUITABLE INTERFACE	
5. define <u>software</u>;	Encourage the students to research information literature to assist with the preparation of a definition for <u>software</u>.	<u>DEFINITIONS OF SOFTWARE</u> 1. A general name for computer programs 2. All the instructions which make a computer operate in a required manner 3. Programs or segments of programs 4. A set of computer programs, procedures and, possibly, associated documentation concerned with the operation of a data processing system (e.g., compilers, library routines, manuals)

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
6. classify software;	Make the students aware of the two broad general types of software: systems software (programs) and applications software (programs).	MAIN TYPES OF SOFTWARE 1. Systems software 2. Applications software
7. explain the purpose of software;	Emphasize that software is the single most important part of the computer and that its main function is to instruct the computer what to do. Point out the following types of systems software: a) programs that are manufacturer-supplied, written for the operating system and stored in the computer; b) programs that enable the computer hardware to function efficiently; c) programs whose primary function is to manage and control the physical and logical resources of a data processing system and to provide centralized utility functions; d) programs that extend and facilitate the capabilities of the computer. Note the following types of applications software: a) prewritten and/or user-written programs; b) written by the user to assist the computer system to do specific tasks; c) sets of instructions that enable the user/s of the system to process business data related to the balancing of chequebooks, the solving of business mathematics and accounting problems, and other business problems; d) software that works in direct support of the end user.	Computer Software (colour filmstrip, cassette, guide), Prentice-Hall Media Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc. Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 2, 12 Fundamentals of Data Processing, South-Western Publishing Company, Chapter 7
8. identify the components of a computer system;	Review the idea that a computer is an information machine which stores and manipulates data in much the same way as brain cells do. Point out that a computer is built around devices for	Brochures from manufacturers

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	giving it instructions (input), receiving requested information (output), serving as memory, storing information, and central processing. Indicate that central processing is similar to central control--the device which makes everything come together and function in harmony. Explain that computer systems come in many different sizes. Illustrate and describe the components of a computer system. Ask the students to prepare lists and descriptions of input/output and auxiliary storage devices and discuss the historical significance of each. Have the students explain/diagram them to illustrate their relationship to the central processing unit (CPU). Make sure the students understand the meaning of CPU, Main Storage, Arithmetic and Logic Unit, and Control System. COMPONENTS OF COMPUTERS/COMPUTER SYSTEMS  Review the differences between the input devices that depend on source documents and those that do not.	Illustrations from textbooks/ periodicals The Central Processor (colour filmstrip, cassette, guide), Prentice-Hall Media Basic Storage Media (colour filmstrip, cassette, guide), Prentice-Hall Media COMPONENTS OF A COMPUTER SYSTEM 1. Processor Unit 2. Operator console 3. Input devices and input media 4. Output devices and output media 5. Auxiliary storage devices Bulletin board display of different sizes of computer systems The World of Computers and Information Processing, John Wiley and Sons, Chapter 5

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	INPUT DEVICES AND CPU  Have the students study the following diagram and distinguish between devices producing hard copy and soft copy. OUTPUT DEVICES AND CPU  	TYPES OF INPUT DEVICES 1. Card reader 2. CRT display keyboard 3. Magnetic disc drive 4. Magnetic tape drive 5. MICR--Magnetic Ink Character Recognition unit 6. Optical scanner 7. Paper tape reader Bulletin board display of input devices The World of Computers and Information Processing, John Wiley and Sons, Chapter 6 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1,3,5 TYPES OF OUTPUT DEVICES 1. Audio response 2. CRT display 3. Magnetic disc 4. Magnetic tape 5. Microfilm 6. Printer Bulletin board display of output devices The World of Computers and Information Processing, John Wiley and Sons, Chapter 7 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1,3,6

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		A Day In the Life of a Computer (slides, cassette), J. Weston Walch, Publisher
	Plan field trips with the class to acquaint students with different sizes of computer systems. Invite a sales representative or other persons to talk to the class about computer systems.	Bulletin board displays of different sizes of computer systems
9. recognize the categories of computers;	Identify and describe the following categories of computers: mainframe, minicomputer, microcomputer.	MAINFRAME: Large computers capable of processing large amounts of data at very fast speeds with access to billions of characters of data
	Explain that minicomputers are a range of computers larger than microcomputers and smaller than what are usually called "mainframes."	MINICOMPUTER: A computer system which has less computer storage, slower processing speeds, and lower cost than a mainframe
	Emphasize that a microcomputer is a very small computer that uses a microprocessor for its central processing unit. Explain that a microprocessor is a small silicon chip which makes up the entire central processing unit. Point out that microcomputers take their names from the micro-miniaturization of the basic electronic components of a computer.	MICROCOMPUTER: A computer system generally consisting of cathode ray tube (CRT), a keyboard, and a limited storage based upon a microprocessor (CPU) Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapter II
10. define memory;	Describe and explain the purposes of memory: a) a measure of the size of a computer is the working storage area; b) a storage area for the instructions (software) and data that the computer will use to do the work; c) the amount of memory will determine the complexity and volume of work that the computer can do.	Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. 1.19-1.27

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Ask the students to give examples of main memory (integrated circuits), floppy discs, cassette tape, etc.	DEFINITIONS OF MEMORY 1. Devices into which data can be entered, in which they can be held, and from which they can be retrieved at a later time 2. Circuitry and devices that hold the binary inputs and outputs the computer can access
	Point out that every computer has a maximum amount of memory it can readily address and that without memory the computer has nowhere to store its data and instructions and no "scratch pad" for calculations.	"Pushing the Limits of Magnetic Disc Technology," Data Management, July 1982
ii. identify the acronyms for the different types of memory;	List and explain the meaning of the following acronyms for different types of memory: ROM, RAM, PROM, EPROM.	TYPES OF MEMORY 1. ROM - Read Only Memory 2. RAM - Random Access Memory 3. PROM - Programmable Read Only Memory 4. EPROM - Erasable Programmable Read Only Memory

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
12. explain the purposes of each type of memory.	Discuss the following aspects of ROM: a) burned into the storage unit at the factory; b) does not forget when the power is turned off; c) stores essential software such as programs that control communication with the computer; d) stores routines required to run external devices. Review the definition and purposes of systems software and point out the relationship between ROM and systems software. Stress that RAM is the storage which may be used to create, store, and test coding; may be erased whenever the power is turned off; and is the memory useable by the student. Review the definition and purposes of applications software and point out its relationship to RAM. Discuss and explain that the Programmable ROM is a blank memory chip that allows a set of instructions to be loaded into the circuits by the user. Point out that once the information has been loaded into the chip, the input wire is cut, and the loaded information cannot be altered.	PURPOSES OF MEMORY 1. ROM: A type of memory which can be read from and used but cannot be altered 2. RAM: A type of memory in which data can be written and read from the storage element 3. PROM: A type of memory whose contents can be read but cannot be altered when used as part of the computer system; it can be programmed by the user before being assembled as a part of the system 4. EPROM: A type of memory whose program can be erased and reprogrammed when required

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Emphasize that the EPROM chip is a variation of the PROM chip and that it is possible to erase the information in the circuit/s by means of an ultraviolet light. Have the students collect information and prepare written reports about PROM and EPROM	
C. Technology in Business The student should be able to: 1. develop an awareness of the implications of computers for employers, employees, business, and industry; 2. understand the implications of computers for employees;	Point out that computers, word processors, telecommunications systems, electronic and programmable gadgets and appliances can be found everywhere in society, in business and industry, from office to kitchen and laundry, from school to recreation room, and from supermarket to banks, and that they direct, influence and even control lives in a myriad of ways. Discuss the effects of computer technology on people, on business, and on business procedures. Review and explain the social and psychological implications and identify and debate the shifts in the economic sectors of society and their influence in the work place. Explain how computers may affect employees. Have the students research and debate the pros and cons of computers in relation to management and employees in various types of industries. Point out, discuss and debate the following: a) Technology continues to take over an ever larger part of lives. b) Public and private sectors are in constant change. c) Workers of all types and levels are being called upon to systematize, incorporate, and adapt to computer processing and to streamline efforts at all levels so as to increase productivity, curb inflation,	<u>IMPLICATIONS OF COMPUTER TECHNOLOGY</u> 1. Threat to jobs and job security 2. Influence on working conditions/nature of workplace 3. Change in job descriptions 4. Influence on speed of work flow 5. Development of changes in interpersonal relationships 6. Influence on leisure-time activities 7. Fear of technology 8. Increased productivity 9. Concern about health issues 10. Others <u>SHIFTS IN ECONOMIC SECTORS OF SOCIETY</u> 1. From manufacturing to a service orientation 2. From a cash to a credit monetary system 3. From national to a transnational economy

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	and compete with international markets. d) Families and individuals must accommodate to ever more diverse demands from the public sector to preserve a quality of life that supports effective human development and is economically sound.	
3. recognize the implications of computers in industry;	Point out that computers and computer systems play a vital part in performing manual tasks and in providing information for making decisions. Discuss and have the students appraise the concept that technology did not suddenly come into being and grow in an unorganized way, but that people brought about the technological advances in response to needs. Have the students relate discussion and appraisal to an economic, historical, and sociological chain of events.	Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. 2.31-2.45 ECONOMIC, HISTORICAL, SOCIOLOGICAL CHAIN OF EVENTS 1. Industrialization of manufacturing (homes to factories) 2. Mass production of consumer goods (low-cost alternatives to home production of textiles, clothing, furniture, food, tools, toys) 3. Families become consuming units (selection and use of ready-made products)
4. describe the implications of computers in business and industry;	Have the students collect information about, prepare reports on, debate the implications of computers in business and industry. Encourage the students to assess, research, and comment on the statements in the following paragraph: One of the most critical changes facing society today is occurring in the field of the new information technologies pervading all of society--factories, offices, stores, schools, hospitals, and homes, bringing with them possibilities for new, more productive ways of life. Rapid and far-reaching transmission of communications and data, safer and more productive factories, low-cost product design, self-paced education, paperless	Articles from newspapers, periodicals Television documentaries Case studies and articles on technology, adjustments to new interpretations of work, and changes in the specific skills during the course of a lifespan

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	offices, medical advances, exploration of space, new scientific discoveries, and a vast array of entertainment and retailing services in the home. Discuss and have the students research and prepare reports on the "electronic cottage." Question the fact that the home may once again become the primary production unit in society. Assess the impact of this possibility: work may be done by computer linkages between the home and business, family members may remain at home, and yet may possibly be employed full time by industry.	
5. recognize the impact of computer technology on types of industries and on firms in each industry.	Review, discuss, and define the three main classifications in the structure of industry. Have the students list examples of each classification of industry: a) primary industries: agriculture, mining, forestry, fishing, trapping; b) secondary industries: manufacturing, construction; c) tertiary industries: transportation, communication, and other utilities; trade; finance; insurance; real estate; services; government. Point out that tertiary industries provide some kind of service people want. Indicate that transportation and trade put things where people want them and that banks and other financial institutions help people to have things when they want them. Provide the students with or have them bring to the classroom periodicals as sources of information. Request the students to add to their store of knowledge about the use of computer technology in business and industry through the following on-going project: collecting articles from periodicals/newspapers, fastening the article/s to an 8 1/2" x 11" paper,	CLASSIFICATIONS OF STRUCTURE OF INDUSTRY 1. Primary 2. Secondary 3. Tertiary PRIMARY INDUSTRIES: Industries directly connected with natural resources SECONDARY INDUSTRIES: Industries connected with the process of producing products TERTIARY INDUSTRIES: Industries which produce service types of business activities SOURCES OF INFORMATION FROM PERIODICALS Articles 1. "New Teams Creating Telidon Pages," MICROS Journal, May 1981

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	preparing a brief description and assessment of each article and covering with a properly identified title page. Have the students identify types of industries and businesses in each classification and collect and compile information about the impact of computer technology on the following industries and businesses: a) manufacturing: mining/smelting, pulp and paper, energy (hydro, petroleum, nuclear), food production (agribusiness, bakeries, creameries, etc.), garment, furniture, automotive, farm equipment, chemicals, computers, electronic, small manufacturing (welders, etc.), and others; b) wholesaling/distribution: food, clothing, electronics, farm machinery, automotive, general merchandise, energy, and others; c) retail trade: supermarkets, department stores, general stores, specialty shops, mail order, vending machines, door-to-door sales, discount retailers, and others; d) service industry: transportation, finance, real estate, health and medical, legal, insurance, repair and maintenance, utilities, office services, education, and others. Ask the students to provide lists of local firms and to identify ways in which they use or may use computers and data processing.	2. "Infomart Becomes a World Leader," MICROS Journal, May 1981 3. "Increasing Productivity Through the Use of Computers," Monitor, April, May, June 1981 4. "Computers Track Tractors as Deere Builds Them," Data Management, November 1981 5. "Forms Design No Simple Task for Busy Ford Truck Dealer," Data Management, November 1981 6. "Explosive Growth Forecast for Manufacturing Automation," MICROS Journal, Summer 1981 7. "Automation of Industry Proceeds at Top Speed," MICROS Journal, Summer 1981 8. "The Office of the Future is Gaining in Momentum," MICROS Journal, February, March 1981 9. "A Regal Approach to Inventory Control," Solutions, Vol. 8, No. 2, 1981 10. "A Firm Expansion," Solutions, Vol. 8, No. 2, 1981 11. "Smoothing Out the Peaks and Valleys in Kentville N.S.," Solutions, Vol. 8, No. 2, 1981 12. "Capturing Data at the Branch Level," Solutions, Vol. 8, No. 1, 1981 13. "Computer Magnifies Professional's Productivity," Solutions, Vol. 8, No. 1, 1981 14. "Building for the Future," Solutions, Vol. 8, No. 1, 1981

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		15. "Simpsons-Sears Buys an Electronic Future." Solutions, Vol. 8, No. 1., 1981 16. "H. J. Heinz was Ripe for the Information Age," Solutions, Vol. 9, No. 1., 1982 17. "'Grain Brain' Computers Transform Elevator Operations," The Manitoba Co-operator, Vol. 40, No. 2, August 1982

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
III. COMMUNICATION OF INFORMATION - 5% A. Communication The student should be able to: 1. define communication;	Discuss, have students prepare a definition of communication, and assess the definition on the basis of research.	DEFINITIONS OF COMMUNICATION 1. The exchange of information 2. The process of conveying and receiving messages, data, or information 3. The process of transmitting information to the point of use 4. The process of transporting or disseminating information to the point of use 5. The process of transmitting data between two points 6. The process of utilizing means and media to move processed information to the ultimate user
2. Identify the purpose and importance of communication;	Point out that communication should be an on-going, two-way process involving speaker(s) and listener(s), givers and receivers, multiple messages, and channels of communication. Debate the following: a) The establishment of effective communication between/among people and management and employees is one of the most important and demanding problems facing individuals and business organizations. b) Effective communication contributes to a better work atmosphere, better output, greater satisfaction, and better personal relationships.	Fundamentals of Data Processing, South-Western Publishing Company, Chapter 1

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Stress the following concepts pertinent to communication. a) Communication is a basic process of organization. b) Communication is the "nervous system" that allows organizations to be cohesive and to function smoothly. c) Communication is the essence of organized activity, the basic process from which come all other functions.	
3. recognize the conditions essential to effective communication;	Discuss and have the students identify and explain the conditions necessary to achieve the purpose of communication. Use case studies and/or specific personal and business examples related to each of the conditions.	CONDITIONS FOR EFFECTIVE COMMUNICATION 1. Information must be transmitted quickly enough to be current. 2. Information must be accessible--that is, easily retrieved for use. 3. Information must be provided on an economical basis, bearing in mind the volume of messages sent and the urgency with which each must be sent. 4. Information should be accurate and should be received in usable condition.
4. identify and explain the communication cycle;	Review the definition of communication and explain its relationship to the communication cycle. Discuss and have the students identify and explain the components and processes of the communication cycle. Point out that any communication cycle and system related to the processing of data involves an interdependence of people and machines.	COMMUNICATION CYCLE Sender ⟷ (Message / Feedback) Receiver
5. explain the methods of communication;	Discuss and have the students list and give examples of various media used for communicating information/data. Emphasize the importance of selecting the media that has the highest degree of accuracy. Point out that	MEDIA FOR COMMUNICATION 1. Audio 2. Visual 3. Electronic

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	traditionally, written or other recorded communications have received major emphasis and have been considered the most accurate and acceptable media. They have accounted for a large percentage of personal and office communication. Discuss the trend toward greater use of oral communication and the relationship of this type of communication to the greater degree of interaction between the computer and the human voice.	Bulletin board display of voice communication media
6. identify and assess the internal and external voice (audio) communication media;	Have the students research, collect information and prepare lists and reports about the various types of internal voice (audio) communication media. Encourage the students to assess each method from the viewpoints of cost, speed, and effectiveness for personal and business communication. Emphasize the importance of selecting the medium giving the highest degree of accuracy.	VOICE (AUDIO) COMMUNICATIONS Internal 1. Telephone 2. Inter-communication system 3. Electric paging system 4. Closed-circuit television 5. Other External 1. Telephone 2. Closed-circuit television 3. Other
7. identify and assess the internal and external written communication media.	Have the students research, collect information and prepare lists and reports about the various types of internal and external written communication media. Ask the students to prepare assessments of each method from the viewpoints of cost, speed, and effectiveness for personal and business communication. Emphasize the importance of selecting the communication medium giving the highest degree of accuracy.	WRITTEN COMMUNICATIONS Internal 1. Memoranda, forms, reports delivered by personal messengers and conveyer systems 2. Electronic longhand transmission 3. Punched cards, punched paper tape, magnetic tape, microfilm, etc., used in the data processing system 4. Communication via computers 5. Other

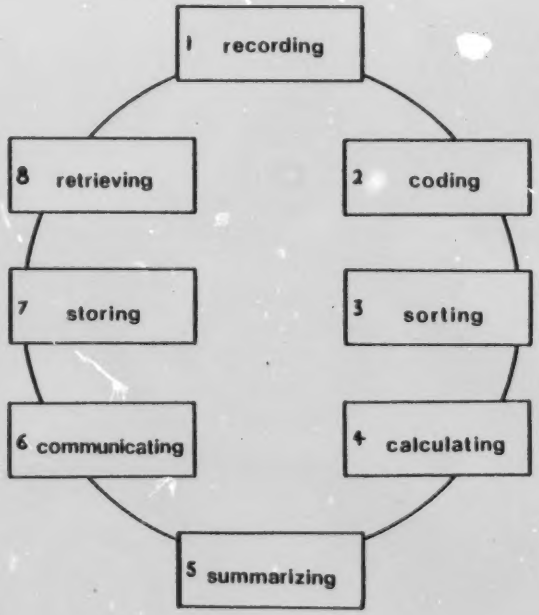
GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		External 1. Correspondence, forms, and other business papers delivered by messenger service and mail service 2. Facsimile reproduction and transmission 3. Teletypewriter service to branch offices through private lines, and to other business firms connected through the TWX exchange 4. Telegraphic service 5. Telephone and telegraph facilities for data communications 6. Communication via computers 7. Other Bulletin board displays of written communication media
B. Data Communication Systems The student should be able to: 1. describe data communication systems;	Explain that people and machines combine to form data communication systems to move information, making decisions and for controlling business operations. Have the students identify, collect information, and prepare reports about the various types of data communication systems. Ask them to include the following in their reports: a) data communications today; b) components of a data communications system; c) channels for data communications; d) transmission of data over communication channels; e) types of transmission of lines and line configuration; f) data communications network;	TYPES OF DATA COMMUNICATION SYSTEMS 1. On-line systems 2. Real time systems 3. Timesharing systems COMPONENTS OF DATA COMMUNICATION SYSTEMS 1. Terminals 2. Modems 3. Couplers Introduction to Computers and Data Processing; Transparency Masters, Anaheim Publishing Company, Transparencies Masters 8-2,

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	g) beaming data around the world.	8-9, 8-10, 8-13, 8-14, 8-18, 8-19, 8-20, 8-22, 8-25 - 8-29 BASIC TYPES OF COMMUNICATIONS CHANNELS 1. Telephone lines 2. Coaxial cables 3. Microwave transmission 4. Communication satellites 5. Fibre Optics
2. Identify the purpose of data communication systems;	Point out that the purpose of data communication systems is to move information within offices, between offices, provincially, nationally, and internationally. Discuss the following: a) Data must be gathered from various sources before they can be processed. b) Data may be located at various desks and files within an office, in offices in several different locations, in decentralized locations such as manufacturing plants, warehouses, mines, farms, oil fields, hospitals, law offices, libraries, schools, and other locations. c) Trends related to the movement of data are away from batch towards interactive and remote processing. d) Computer communication and satellites are increasingly important in communications systems and networks. Consider the relationship between data communication systems and the possible "electronic cottage."	Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapter 23 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 2, 8 Data Processing with Applications, Reston Publishing Company, Inc., Chapters 2, 10 BASIC Computing: A Complete Course, McGraw-Hill Ryerson, Ltd., Chapter 15
3. recognize the relationship of accuracy to communication and data communication systems.	Emphasize that accuracy is crucial to communication and to data communication systems. Point out that data in an automated system are used many times and in many ways, and that errors will result unless data are carefully prepared for input to the system.	

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
IV. PROCESSING DATA ON A COMPUTER SYSTEM - 15%	Review the definitions and purposes of data, information, communication, and data communication systems. Discuss their relationship and explain their relationship to data files.	
A. Data Files The student should be able to:		
1. describe the purpose of data files;	Emphasize the following: a) Storage and retrieval of records and information are common in everyday life. b) All records and information are created, classified, stored, retrieved when necessary, and returned to storage or destroyed. c) Files represent the archives, or storage centres, of information for individuals, organizations, and businesses.	Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. 3.17 and 13.6
2. understand the need for organization of data files;	Discuss the importance of a basic system of rules and regulations for classifying and storing records in order to locate the records when they are needed. Point out that the theory of filing is the same whether manual or automated methods are used.	Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 3 Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, Chapter 6 Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Company, Chapter 2
3. identify the types of file media;	Discuss and have the students list and give examples of each of the types of file media, such as: a) manual: notebooks, card index, Kardex, vertical file; b) mechanical: microfilm, microfiche; c) electronic: magnetic storage, tapes (reel-to-reel, cassettes), discs and diskettes, memory (ROM, RAM, bubble),	TYPES OF FILE MEDIA 1. Manual 2. Mechanical 3. Electronic

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	mass storage, video discs.	
4. compare the types of file media;	Discuss the similarities and differences of manual, mechanical, and electronic file media in relation to cost, convenience, space required, and application of each type of medium.	Bulletin board display of file media
5. recognize the relationship between data organization and computer operation;	Stress the following: a) The computer operates on data to produce information. b) The processing of data requires organization for input into the computer system. c) The computer stores/classifies data. d) The computer outputs data from processing of a record.	Basic Storage Media (colour filmstrip, cassette, guide), Prentice-Hall Media Automated Filing Systems and Records Management (colour filmstrips, cassettes, guide, reproducible masters), Prentice-Hall Media
6. identify the logical entities for organizing data.	List and explain the following entities for organizing data for a computer: character, field, record, files. Discuss their relationship, and have the students give examples of each.	CHARACTER: Number, letter, punctuation mark, composed of a group of related bits FIELD: One unit of data or a group of related characters or columns RECORD: A collection of fields related to a specific unit of information FILE: A collection of related records Data Processing with Applications, Reston Publishing Company, Inc., Chapter 9 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapters 5, 7, 8

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
B. Data Processing Cycle The student should be able to: 1. recognize the purpose of the data processing cycle;	Present an overview of the data processing cycle. Emphasize that regardless of computer size and the application being processed, the basic processing cycle, input-process-output, is common to all computers.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 3 Data Processing with Applications, Reston Publishing Company, Inc., Chapter 9
2. identify the basic components of the data processing cycle; 3. describe the purposes of the basic components of the data processing cycle;	Discuss and have the students define and explain the purpose of each of the basic components. Emphasize the following purposes: a) Input operation causes data to be stored in main computer storage. b) Process operation manipulates the data; producing the information required. c) Output operation causes the results of the processing to be printed or displayed in a usable format.	BASIC COMPONENTS OF THE DATA PROCESSING CYCLE 1. Input operation 2. Process operation 3. Output operation
4. explain the relationship of the data processing cycle to data files;	Discuss the processing cycle in relation to data files.	
5. identify the basic processing concepts.	Point out that, during the process component of the data processing cycle, computers perform three basic operations. Use an application example to explain the basic process operations.	BASIC PROCESS OPERATIONS 1. Input/output operations 2. Arithmetic operations 3. Logical operations Data Recording, Computer Output, Processing Data (colour filmstrips, cassettes, guides), Prentice-Hall Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
C. Data Processing Functions The student should be able to: 1. Identify the data processing functions;	Prepare a list of the data processing functions. DATA PROCESSING OPERATIONS  	DATA PROCESSING FUNCTIONS 1. Recording 2. Coding 3. Sorting 4. Calculating 5. Summarizing 6. Communicating 7. Storing 8. Retrieving RECORDING: Writing, rewriting, or reproducing data by hand or by machine CODING: Assigning a system of symbols, letters of the alphabet, numbers, or words to data in accordance with a set of rules SORTING: Arranging information in order or separating it into similar groups CALCULATING: Computing in order to arrive at a mathematical result SUMMARIZING: Converting processed data into a concise, usable form COMMUNICATING: Transporting or disseminating information to the point of use STORING: Placing information in a location in storage so that it can be retrieved for later use

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		RETRIEVING: Making stored information available
2. define and explain the purpose of the data processing functions.	Have the students collect information from which to prepare definitions and to explain the purpose of each of the data processing functions. Compare manual methods with the way these functions are performed by machines. Explain the relationship of the functions to the components of the computer and the data processing cycle. Encourage the students to prepare a panel discussion on the data processing functions.	Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Company, Chapter 2 Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, Chapter 1 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 3
D. Program Accessing The student should be able to: 1. define the term program;	Discuss and define the term program. Relate the discussion to the preparation of verbal instructions to complete specific tasks. During the discussion, have the students prepare a list of the instructions in human language and ask two or three students to carry out the instructions for specific tasks. To reinforce the basic concept of step-by-step instructions and to develop an awareness of the need for a sequence of explicit instructions, pair the students to role play robot and master. Point out that master is to issue the explicit sequence instructions in command form, in order to "program" the robot to carry out the tasks.	PROGRAM: Detailed set of instructions for solving a problem Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, pp. 212-218 EXAMPLES OF PROBLEMS TO BE SOLVED BY STEP-BY-STEP INSTRUCTIONS 1. Take a book to someone in the classroom. 2. Close the window. 3. Open the door. 4. Remove the cover from the typewriter. 5. Peel an orange; an apple. 6. Fill in a form (telephone message, application form). 7. Construct an object from given materials.

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
2. describe the concept of a stored program;	Ask the students to research references for information about a stored program. Have the class discuss the findings and relate the discussion to software.	STORED PROGRAM: Instructions stored internally in the main storage unit of the computer Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 5
3. explain the process of submitting data to a computer;	Discuss preparation and coding in relation to program specifications.	Instruction manuals from manufacturers Typing Drill (instructor's guide, transparency masters, study guides, floppy disc/cassette), Pacific Learning Institute
4. identify and use system commands;	Identify and discuss the purpose of system commands. Demonstrate and have the students use system commands.	SYSTEM COMMAND: An instruction not in a computer program that tells a computer system what to do with a program EXAMPLES OF SYSTEM COMMANDS 1. NEW 2. SAVE 3. LOAD 4. RUN 5. LIST
5. explain and differentiate between batch and interactive processing.	Discuss and define batch and interactive processing. Point out the following: a) In batch processing, the output comes at the end of the program. The Manitoba School Network is a batch system. b) In interactive processing, the output and input cycle is continuous during the running of the program. A microcomputer is an interactive/transaction-oriented system.	BATCH PROCESSING: A method of grouping jobs of a similar nature to assist in their processing INTERACTIVE PROCESSING: A type of processing involving continuous dialogue between the user and the computer; i.e., the user make an entry and the computer responds almost immediately

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
V. PROBLEM SOLVING AND FLOWCHARTING - 10%	Integrate problem solving and flowcharting throughout Data Processing 202 and 302.	Programming Logic: Use of Flowcharts (colour filmstrip, cassette, guide), Prentice-Hall Media
A. Problem Solving The student should be able to:		
1. outline a model for problem solving;	Discuss and have the students identify the steps in a model for problem solving.	PROBLEM-SOLVING MODEL 1. Understand the problem. 2. Devise a plan to solve the problem. 3. Carry out the plan. 4. Test the solution. 5. Document the action.
2. explain the need for a problem-solving model.	Point out the importance of testing a solution against a known answer to a problem and of using a systematic approach in solving problems. Emphasize the need to develop a foundation in problem-solving concepts prior to the acrual writing of programs.	
B. Flowcharting The student should be able to:		
1. define flowcharting;	Discuss the relationship of flowcharting to problem-solving techniques, data processing operations, media, equipment, data flow, and software.	DEFINITIONS OF FLOWCHARTING 1. The process of graphically depicting the detailed steps in the solution of a problem 2. A diagram which uses arrows and special symbols to represent the steps in a problem solution 3. A graphic representation of order of operations in a data processing system or program, in which symbols are used to represent

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		processing operations, media, equipment, and data flow. 4. A common method of graphically planning what a piece of software should do before the actual writing process begins, or for describing what it does after it is written.
2. explain the purpose of flowcharting.	Refer to the definitions of flowcharting. Point out that flowcharting is an alternate method of programming without using a computer language, as well as a program design tool.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 10 and 11 Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, Chapter 9 Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Company, Chapter 2
3. identify and use flowcharting symbols;	Refer to a template for examples of standardized symbols used in flowcharts to design the logic for a problem, a program, and a system.	Template Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapters 12, 20 The World of Computers and Information Processing, John Wiley and Sons, Chapters 2, 3
4. use flowcharting to solve problems;	Have the students prepare and use flowcharts to solve simple and complex problems and to diagnose office tasks, showing in detail the different activities to be performed and the sequence in which they will occur. Emphasize that flowcharting is a crucial part of computer problem solving.	

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
5. prepare program flowcharts;	Define and discuss program flowcharts. Point out that a program flowchart consists of a series of symbols designed to illustrate graphically the detailed steps required to solve a problem.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 11 and pp. A.2-A.3
6. prepare systems flowcharts;	Define and explain systems flowcharts. Emphasize that a systems flowchart consists of a series of symbols designed to illustrate graphically the procedural steps in a system.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 10 and Figure 10-8
7. compare program and systems flowcharts.	Discuss and have the students collect information to prepare either oral or written illustrated reports about program and systems flowcharts.	Bulletin board display, charts, posters of program and systems flowcharts

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
VI. PROGRAMMING - 20%		
A. Introduction		
The student should be able to:		
1. define programming;	Discuss and have the students prepare a definition for the term programming.	PROGRAMMING: The process of writing instructions for a computer
2. define computer program;	Explain and illustrate a computer program. Discuss the relationship between programming and computer program.	COMPUTER PROGRAM: A series of instructions which direct the computer to perform a sequence of tasks that produce a desired output or a series of instructions designed to guide the computer, step by step, through some process
3. identify the steps in the program development cycle;	List and discuss the steps in the program development cycle. Relate these steps to the series of steps in problem solving, to flowcharting, and to programming in human languages. Emphasize the importance of following the cycle during the development of a program, regardless of the size and the complexity of the program.	STEPS IN PROGRAM DEVELOPMENT CYCLE 1. Review system and program specifications 2. Design the program 3. Code the program 4. Test the program 5. Document the program Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 11 and 12
4. explain the purpose of a program.	Review the definitions for programming and computer program. Point out that a computer is unable, as yet, to function automatically, and therefore must receive explicit instructions in the form of a program which may be written in a variety of languages.	Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapter 15 Data Processing with Applications, Reston Publishing Company, Inc., Chapter 12

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Writing a Program (colour filmstrip, cassette, guide), Prentice-Hall Media
B. Introduction to Programming Languages The student should be able to:		
1. define programming language;	Explain and have the students write a definition for programming language.	PROGRAMMING LANGUAGE: A language used to create computer programs The World of Computers and Information Processing, John Wiley and Sons, Chapter 4
2. explain the purpose of a programming language;	Emphasize the following: a) A user can talk to a computer only through a language that a computer can interpret. b) Computers, as yet, cannot adequately translate human language. c) Rules governing the various computer languages are important. d) Each computer language contains specific words and rules of the system which must be followed exactly.	Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapters 14, 15 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 12 Programming Languages (colour filmstrip, cassette, guide), Prentice-Hall Media Computers: Peripherals and Programming (colour filmstrip/cassette/slide set/video tape), AIM Educational Aids
3. describe the most widely used programming languages;	Identify and point out the following main purposes of the most widely used programming languages: a) COBOL: uses terms similar to English to process business applications; b) FORTRAN: solves mathematical and scientific problems; c) BASIC: a simple language for remote terminal use;	PROGRAMMING LANGUAGES 1. COBOL: Common Business Oriented Language 2. FORTRAN: FORmula TRANslation 3. BASIC: Beginners All-purpose Symbolic Instruction Code 4. PASCAL: Language named after the seventeenth century French mathematician, Blaise Pascal

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	d) PASCAL: a structured microcomputer language; e) RPG: prepares basic business reports; f) PL/I: all-purpose language for both scientists and business people; g) BAL: like a machine language; is difficult to learn; uses the computer efficiently; h) APT: controls machine processing; i) APL: simple language used mainly with terminals. Locate and/or have the students locate examples of programs written in the various programming languages. Prepare a labelled bulletin board display of the examples.	5. RPG: Report Program Generator 6. PL/I: Programming Language One 7. BAL: Basic Assembler Language 8. APT: Automatic Programmed Tool 9. APL: A Programmed Language 10. Others
4. explain the historical development of programming languages.	Encourage the students to research and trace the historical development of programming languages. Relate the historical development of programming languages to the evolution of computers and data processing. Ask the students to consider why there are so many programming languages.	
B. Introduction to BASIC The student should be able to: 1. describe the development of BASIC;	Ask the students to collect information about BASIC and its inventors, and to prepare a report on the development of BASIC.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 12 and Appendix A Data Processing with Applications, Reston Publishing Company, Chapter 16 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapter 14 Fundamentals of Data Processing, 2nd ed., South-Western Publishing Company, Chapter 10

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
2. explain the purpose of the following BASIC commands: REM, END, LET, PRINT, GO TO, IF, READ, DATA, FOR/NEXT, DIM, 3. explain the rules for writing BASIC statements;	Discuss the purpose and demonstrate the use of each of the BASIC commands. Point out the need to proceed on a step-by-step basis to learn the commands and other BASIC components thoroughly. Explain the relationship of the two parts of the FOR/NEXT command. Show the students and/or have them locate examples of programs written in BASIC. Have them study the statements in the programs and discuss the rules for writing the statements. Point out that each statement contains a command. Have the students review and explain the introductory BASIC commands.	Programming in BASIC;A Complete Course, Holt, Rinehart and Winston of Canada, Ltd. PURPOSES OF BASIC COMMANDS REM: used to document the programs with remarks END: used to indicate the last instruction in the program LET: used when performing arithmetic calculations and assigning values to areas of storage PRINT: used to cause data to be displayed as output GO TO: used to give the line number of a statement to which unconditional branch must be made IF: causes comparing operations to take place READ: tells the computer to read one or more variables that are listed in the READ statement and to give them values listed in the DATA statement DATA: used to define data or to tell the computer the values of data to be input FOR/NEXT: two commands to set up a loop (FOR) and to mark the end of a loop (NEXT) DIM: used to reserve areas of storage for tables or arrays

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
4. code and run programs illustrating the use of the following BASIC commands: REM, END, LET, PRINT, GO TO, IF, READ, DATA, FOR/NEXT, DIM;	Review the purposes of the introductory BASIC commands and the rules for writing BASIC statements. Identify and explain the components and describe the format of statements and programs written in BASIC. Give the students copies of simple BASIC statements and programs, and have them identify the components and explain the purpose of each component. Point out that a BASIC program consists of a series of statements arranged sequentially to solve a problem. Discuss the relationship among commands, statements, components of statements, and programs.	Illustrations of BASIC statements and programs COMPONENTS OF BASIC STATEMENTS 1. Line number 2. Command 3. Variable name 4. Arithmetic operator Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., pp. 304-314 Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. A.1-A.7 Learning BASIC Fast, revised edition, Reston Publishing Company, Inc. (distributed by Prentice-Hall) Programming Languages--BASIC (colour filmstrip/slide set/ videotape), AIM Educational Aids Introduction to the BASIC Language (instructor's guide, transparency masters, study guides, floppy disc/cassette), Pacific Learning Institute Writing a BASIC Program (colour filmstrips, cassettes, guide), Prentice-Hall Media Part I - Getting Started with the Computer, Part II - Mathematical Operations (colour filmstrips, cassettes, handbook), Coronet Instructional Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
5. Identify and explain the procedures for using a terminal/computer;	Using a step-by-step approach, demonstrate and have the students follow the procedures to run introductory BASIC programs.	Manuals for terminals/computers Introduction to the BASIC Language (instructor's guide, transparency masters, study guides, floppy disc/cassette), Pacific Learning Institute Essentials of BASIC (Part 1) (Part 2) (16mm colour films), Edutronics Systems International, McGraw-Hill Ryerson Radio Shack TRS-80 Model III Operations, Atari Model 800 Operations, Apple II Operations, Commodore CBM/PET Operations, and Radio Shack TRS-80 Model II Operations (filmstrip/slide set/videotape), AIM Educational Aids
6. code and run programs to solve simple business problems.	Initially, use business problems which involve only a few steps to ensure that the students experience success early. Have them write short, simple programs that enable correct output to be obtained easily. Proceed as follows: use the chalkboard/overhead transparency to list problem-solving steps, to flowchart the steps with symbols, to write the flowchart in human language pseudo code, and to convert these steps (problem-solving/flowchart/human language/pseudo code program) into BASIC statements.	PROJECTS FROM WORKBOOK AND STUDY GUIDE TO ACCOMPANY INTRODUCTION TO COMPUTERS AND DATA PROCESSING 1. Project 7 - Chapter 1 2. Project 7 - Chapter 2 3. Project 10 - Chapter 3 4. Project 11 - Chapter 4 5. Project 7 - Chapter 5 6. Project 6 - Chapter 6 Refer to the bibliography for specific information about these projects. Elementary BASIC Coding (colour filmstrips, cassettes, guide), Prentice-Hall Media Programming Routines (colour filmstrip, cassette, guide), Prentice-Hall Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Have the students use a step-by-step approach to record and to check each of the problem-solving steps, the flowchart symbols, human language/ pseudo code program, and the BASIC statements. Emphasize the need to use this approach to ensure accuracy. Point out the need for accuracy. Explain that much of the data handled in business will ultimately find its way to the computer for processing and that an error generated in a business problem causes the recurrence of the error many times since the data is used repeatedly.	Part III - Loops and Subroutines, Part IV - Introduction to Original Programming, Part V - Programming Techniques and Flow Charts (colour filmstrips, cassettes, handbook), Coronet Instructional Media
VII. INTRODUCTION TO COMPUTER BUSINESS APPLICATIONS - 15%	Emphasize that this section is the capstone of the curriculum for Data Processing 202. Explain that the main purpose of the section is to bring together all the concepts, link them to real-life situations, and assist students to become intelligent users of the computer.	
A. Computer Business Applications The student should be able to:		
1. explain how businesses use computer programs to solve problems;	Discuss and have the students prepare a well-researched and documented paper on the use of programs to solve problems and document information in many different types of business.	APPLICATIONS OF COMPUTER PROGRAMS IN BUSINESS 1. Small business applications 2. Large business applications 3. Accounting/clerical/word processing applications 4. Others
2. identify computer application criteria;	Discuss, explain, and have the students use the criteria in the preparation of research papers and in the solution of business problems. Have the students arrange field trips to various types of business, prepare and use a questionnaire for interviews, and take part in work experience to obtain information for research paper/s.	COMPUTER APPLICATION CRITERIA 1. Define the nature of the problem. 2. Identify hardware/software. 3. Describe job descriptions and routines. 4. Describe the interaction of problems, hardware, software, routines, and people.

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
3. use pre-written, packaged programs to simulate business applications.	Explain and demonstrate the use of pre-written programs.	PROJECTS FOR PET COMMODORE 1. Accounts (cassette) Refer to bibliography for specific information about this project. PROJECTS FOR TRS-80 MODEL III 1. Annuity/BAS 2. Loan/BAS 3. Payroll/BAS 4. Acct 7 5. Slamort Refer to bibliography for specific information about these projects. PROJECTS FROM PACIFIC LEARNING INSTITUTE 1. Typing Drill 2. Introduction to the BASIC Language 3. Printing Mailing Labels 4. Simulation of Cash Register 5. A Restaurant Billing System 6. School Cafeteria Inventory 7. Absentee Recording 8. A Centralized Billing System 9. The Design of a Teaching Program Refer to bibliography for specific information about these projects. PROGRAMS FOR MANITOBA SCHOOLS COMPUTER NETWORK 1. CARDIAC 2. MORTC 3. PAYC 4. SIMPINTC

BIBLIOGRAPHY

Data Processing 202

Textbooks

De Rossi, Claude. Learning BASIC Fast. rev. ed. Reston, Virginia: Reston Publishing Company, Inc., 1979. (Distributed by Prentice-Hall Canada, Incorporated.)

Shelly, Gary B, and Thomas J. Cashman. Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

Reference Books

Berger, Melvin. Computers in Your Life. New York, N.Y.: Thomas Y. Crowell and Company, 1981.

Bitter, Gary G. Exploring with Computers. New York, N.Y.: Julian Messner, 1981.

Brown, Jerald R. INSTANT Freeze-Dried Computer Programming in BASIC. Beaverton, Oregon: Dilithium Press, 1978.

Cassel, Don, and Martin Jackson. Introduction to Computers and Information Processing. Reston, Virginia: Reston Publishing Company, Inc., 1980.

Canada Department of Employment and Immigration. Occupational Analyses Series. Ottawa: The Department, n.d.

Canada Department of Manpower and Immigration. The Canadian Classification and Dictionary of Occupations. Ottawa: The Department, 1971-1973.

----------. Training Manual for Canadian Classification and Dictionary of Occupations. Volume I. Ottawa: The Department, 1972.

Condon, Robert J. Data Processing with Applications. 2nd ed. Reston, Virginia: Reston Publishing Company, Inc., 1981.

Crawford, Tim. BASIC Computing: A Complete Course. Scarborough, Ontario: McGraw-Hill Ryerson, Limited, 1981.

DuVall, J. Barry, George R. Maughm and Ernest Berger. Getting the Message: The Technology of Communication. Worcester, Calif.: Davis Publications, 1981.

Fiskman, Katherine Davis. The Computer Establishment. New York, N.Y.: Harper and Row, 1981.

Hampshire, Nick. The PET Revealed. 2nd ed. P. O. Box 13 Yeovil, Somerset, England: Computabits, 1980.

Hildon, Karl J., ed. The Best of the Tranactor. Volume I. Agincourt, Ontario: Commodore Business Machines, Ltd., n.d.

Kelley, Rob. The World of Computers and Information Processing. Toronto, Ontario: John Wiley and Sons, 1982.

Majernik, John A. All About Data Processing. Portland, Maine: J. Weston Walch, Publisher, n.d.

McRitchie, Margaret. Programming in BASIC: A Complete Course. Toronto, Ontario: Holt, Rinehart and Winston of Canada, Ltd., 1982.

----------. Solutions Manual: Programming in BASIC: A Complete Course. Toronto, Ontario: Holt, Rinehart and Winston of Canada, Ltd., 1982.

Rinder, Robert M. A Practical Guide to Small Computers for Business and Professional Use. New York, N.Y.: Monarch Press, 1981.

Sanders, Donald H. Computers in Business. 4th ed. New York, N.Y.: McGraw-Hill Book Company, 1979.

----------. Computers in Society. 3rd ed. New York, N.Y.: McGraw-Hill Book Company, 1981.

Shelly, Gary B., and Thomas J. Cashman. Answer Manual, Student Workbook, and Study Guide to Accompany Introduction to Computers and Data Processing; With Auxiliary BASIC Programming Assignments. Fullerton, Calif.: Anaheim Pub-

lishing Company, 1980.

----------. Instructor's Guide and Answer Manual to Accompany Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

----------. Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

----------. Test Bank to Accompany Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

----------. Transparency Masters: Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

Sippl, Charles J., and Roger J. Sippl. Computer Dictionary. Indianapolis, Indiana: Howard W. Sams and Company, Inc., 1980.

Software Encyclopedia. Commodore Business Machines, Inc., Computer Systems Division, 681 Moore Road, King of Prussia, Pa. 19406, n.d.

Summer, Clarie, and Walter A. Levy. Microcomputers for Business. New York: N.Y.: Amacom/A division of American Management Associations, 1980.

The BASIC Conversions Handbook for Apple, TRS-80, and PET Users. Rochelle Park, N.J.: Hayden Book Company, Inc., n.d.

Van Tassel, Dennie L. The Compleat Computer. Chicago, Ill.: Science Research Associates, Inc., 1976.

Wanous, S. J. Gerald E. Wagner, and Stephen F. Hallam. Introduction to Automated Data Processing. 2nd ed. Cincinnati, Ohio: South-Western Publishing Company, 1979.

----------. Manual Introduction to Automated Data Processing. 2nd ed. Cincinnati, Ohio: South-Western Publishing Company, 1979.

Wanous, S. J., Gerald E. Wagner, and Judith J. Lambrecht. Fundamentals of Data Processing. 2nd ed. Cincinnati, Ohio: South-Western Publishing Company, 1981.

Periodicals

AEDS Monitor. Association for Educational Data Systems, 1201 16th Street, N.W., Washington, D.C. 20036 (four issues)

Annals of the History of Computing. American Federation of Information Processing Societies, 1815 N. Lynn Street, Ste. 800, Arlington, Virginia 22209

Apple Educators Newsletter. 9525 Lucerne, Ventura, Calif. 93004 (bimonthly; contains a variety of applications and programs)

Business Education Forum. National Business Education Association, 1906 Association Drive, Reston, Virginia 22091

BYTE. Box 590, Martinsville, N.J. 08836 (monthly)

Canadian Datasystems. Box 9100, Postal Station A, Toronto, Ontario M5W 1V5 (monthly)

Canadian Vocational Journal. Canadian Vocational Association, Suite 608, 251 Bank Street, Ottawa, Ontario K2P 1X3 (4 issues)

Compute: The Journal for Progressive Computing. Small Systems Services, Inc., P. O. Box 5046, Greensboro, North Carolina 27403 (monthly; specific sections refer to the Apple, Atari, PET, and other systems)

Computer Data - The Canadian Computer Magazine. Suite 2504, 2 Bloor Street West, Toronto, Ontario M4W 3G1 (monthly)

Computing Canada. 211 Consumers Road, Suite 106, Willowdale, Ontario M2J 4G8 (weekly)

Contact. Gage Educational Publishing, Limited, 164 Commander Boulevard, Agincourt, Ontario MIS 3C7 (4 issues; free)

Course Ware Magazine. Suite 222A, 4919 N. Millbrook #222, Fresno, Calif. 93726 (5 issues accompanied by programs - cassette/diskette, teacher's guide, student guide, and student worksheet - for Apple, PET, TRS-80 microcomputers)

Data Management. Data Processing Management Association, 505 Busse Highway, Park Ridge, Ill. 60068 (monthly)

Datamation. 875 Third Avenue, New York, N.Y. 10022 (monthly)

DP Directory. DP Directory, POB 562, Bloomfield, Conn. 06002 (monthly)

Educational Computer Magazine. Box 535, Cupertino, Calif. 95015 (bimonthly)

Journal of Business Education. Room 500, 4000 Albermarle Street, N.W., Washington, D.C. 20016 (monthly)

Kilobaud Microcomputing. Box 997, Farmingdale, N.Y. 11737 (monthly)

Management World. Administrative Management Society, AMS Building, Maryland Road, Willow Grove, Pa. 19090 (monthly)

The Manitoba Co-operator. Manitoba Pool Elevators, 220 Portage Avenue, Winnipeg, Manitoba R3C 0A5 (weekly)

Micronews. Information Desk, 218 Education Building, Faculty of Education, University of Manitoba, Winnipeg, Manitoba R3T 2N2

MicroNotes. The Canadian Micrographic Society, Suite No. 309, 2175 Sheppard Avenue, E., Willowdale, Ontario M2J 1W8

Micros. Canadian Micro-systems Journal, 583 Ellice Avenue, Winnipeg, Manitoba R3B 1Z7

Personal Computing. 167 Corey Road, Brookline, Maine 02146 (bimonthly)

Perspectives in Computing. IBM Corporation, 44 South Broadway, White Plains, N.Y. 10601 (quarterly)

Popular Computing. Popular Computing, 70 Main Street, Peterborough, New Hampshire 03458 (monthly)

Small Business Computers Magazine. 39 Hanover Avenue, Morris Plains, N.J. 07050 (bimonthly; valuable resource for business and vocational teachers)

School Microware Reviews. Dresden Associates, Inc., Box 246, Dresden, Maine 04342 (twice a year; serves as a clearing house for recently published programs for the Apple, PET, and TRS-80 systems)

Softalk. 11021 Magnolia Boulevard, North Hollywood, Calif. 91601 (monthly; free for one year to Apple computer users)

Solutions. General Business Group, Communications Department, IBM Canada, Ltd., 101 Valleybrook Drive, Don Mills, Ontario M3B 3H2

The Secretary. PSI, Professional Secretaries International, 2440 Pershing Road, Crown Centre G10, Kansas City, Missouri 64108 (monthly)

TRS-80 Microcomputer News. Tandy Corporation, Box 2910, Fort Worth, Texas 76113 (monthly; six-month free subscription to TRS-80 purchasers)

Words. International Information/Word Processing Association, 1015 North York Road, Willow Grove, Pa. 19090 (bimonthly)

Audio-Visual Materials

The following audio-visual materials are available from Coronet Instructional Media, 200 Steelcase Road East, Markham, Ontario L3R 1G2:

1. Colour Filmstrips, Audio Cassettes, Teacher's Guide
   - Programming Careers
   - Data Processing Careers
   - Hardware Development and Service Careers
   - Peripheral Careers

2. Filmstrips with Cassettes

   a) BASIC for Microcomputers
      - Getting Started with the Computer (Part I)
      - Mathematical Operations (Part II)
      - Loops and Subroutines (Part III)
      - Introduction to Original Programming (Part IV)
      - Programming Techniques and Flowcharts (Part V)

   b) Computer Programming Errors: Debugging

The following audio-visual materials are available from Prentice-Hall Media, 1870 Birchmount Road, Scarborough, Ontario M1P 2J7:

1. Colour Filmstrips with Cassettes and Program Guides

   a) Introduction to Computers and Data Processing

      i) Computer Components
         - The Computer
         - Computer Hardware
         - Basic Storage Media
         - The Central Processor

ii) Handling and Processing Information
- Number Systems
- Computer Software
- Data Recording
- Computer Output
- Processing Data

b) Computer Programming

i) Introduction to Programming
- Programming Languages
- Writing a Program
- Programming Logic: Use of Flowcharts
- Programming Routines

ii) Programming in BASIC
- Writing a BASIC Program
- Elementary BASIC Coding

2. Colour Filmstrips, Cassettes, Guide, Reproducible Masters

- Automated Filing Systems
- Records Management

The following audio-visual materials, including colour slides, carousel trays, cassette tapes, and teacher's guide, are available from The Center for Humanities, Two Holland Avenue, White Plains, N.Y. 10602:

1. At Home with the Computer: What Can It Do For You? (1982)

2. Computer Software: What It Is and How It Works (1982)

- Part I (covers software and computer languages such as machine, assembly, and BASIC)
- Part II (describes a simple program in BASIC which computes compound interest)
- Part III (discusses program branching)
- Part IV (explains a subroutine)

3. Computer Hardware: What It Is and How It Works (1982)

- Part I (presents the basic sections of a computer system tying them together with a comparison to human body systems)
- Part II (describes the process of entering and retrieving information from the machine and explains the special input/output devices developed for schools, businesses, and homes)
- Part III (describes computer memory--ROM and RAM)
- Part IV (describes the coordinating activities of the central processing unit)

The following audio-visual materials, available from Administration Information Media (AIM) Educational Aids, P.O. Box 86704, North Vancouver, B.C. V7L 4L2, are packaged as filmstrips, cassettes, slide sets in carousel trays, and video tapes:

1. Computer Operation Series

- Radio Shack TRS-80 Model III Operations (6300)
- Atari Model 800 Operations (6301)
- Apple II Operations (6302)
- Commodore CBM/PET Operations (6303)
- Radio Shack TRS-80 Model II Operations (6305)

2. Computer Literacy Series

- Computer Terminology-Beginning Level (6350)
- Computer Terminology-Advanced Level (6351)
- Programming Languages-BASIC (6352)
- Disk Operating Systems (DOS) (6353)
- CAD/CAM-Computer Assisted Design and Manufacturing (6354)
- Computer Graphics (6355)

3. Computer Concepts

- Introduction to Computers: The CPU (6100)
- Computers: Peripherals and Programming (6101)
- Personal Computers: Basic Concepts (6102)

The following audio-visual material, including colour slides and cassette, is available from J. Weston Walch, Publisher, Box 658, Portland, Maine 04104:

A Day in the Life of A Computer

The following audio-visual materials, including 1/2" and 3/4" videorecordings and guides, are published by TV Ontario and available from the Library, Department of Education, 1181 Portage Avenue, Winnipeg, Manitoba R3B 0T3:

1. Fast Forward I Series

- The Micro-electronic Revolution
- The Information Marketplace
- Personal Computing
- Global Television
- Humanized Technology
- Biomedical Engineering
- Communications
- New Perspectives
- Television
- Simulations
- Electronic Medicine
- Memory and Storage
- Music

2. Fast Forward 2 Series

- Games
- Lasers
- Education
- Electricity/Energy
- Space
- The Business of Information
- Security
- State of the Arts
- Medicine
- Military Communications
- About Computers
- Transportation
- Implications

The following 16 mm films are available from BBC Enterprises, 55 Bloor Street West, Suite 1220, Toronto, Ontario M4W 1A5:

- Goodbye Gutenberg
- Hands on Micros
- Horizon: Now the Chips Are Down
- Managing the Micro
- The Silicon Factor

The following filmstrip and cassette, produced by Encyclopedia Britannica Educational Corporation, are available from Scholar's Choice, Ltd., 777 Douro Street, Stratford, Ontario N5A 6J9:

- How Computers Work

The following audio-visual materials, including filmstrips, cassettes, and teacher's guide, are available from Guidance Associates, Communications Park, Box 3000, Mount Kisco, New York, N.Y. 10549:

- Computers: From Pebbles to Programs

The following colour-sound 16 mm films, produced by Edutronics Systems International, are available from the Library, Department of Education, 1181 Portage Avenue, Winnipeg, Manitoba R3G 0T3:

- Essentials of BASIC, Part 1
- Essentials of BASIC, Part 2

The following 16 mm films are available from Film Service, Manitoba Telephone System, 489 Empress Street, Winnipeg, Manitoba R3C 0A2:

- The Thinking?? Machine
- Incredible Machine
- Satellite Communications in Canada

Miscellaneous Audio-Visual Materials

1. Posters on Mathematical Machines, available from J. Weston Walch, Publisher, P.O. Box 658, Portland, Maine 04104

2. Introduction to Computers and Data Processing; Transparency Masters, available from Anaheim Publishing Company, 1120 E. Ash, Fullerton, Calif. 92631

3. Transparencies for Introduction to Data Processing, 2nd ed. Gage Educational Publishers, Ltd., 164 Commander Boulevard, Agincourt, Ontario M1S 3C7

4. CARDIAC, available from Manitoba Telephone System, Public Relations Department, 489 Empress Street, Winnipeg, Manitoba R3C 0A2

5. Visual Masters for Teaching About Computers (60 transparency masters), Camelot Publishing Company, Box 1357, Ormond Beach, Florida 32075 (1978)

6. Visual Masters for Teaching BASIC Programming (60 transparency masters), Camelot Publishing Company, Box 1357, Ormond Beach, Florida 32075 (1978)

Programs and Software

The following computer teaching projects, including instructor's guide, transparency masters, study guides, and floppy disc/cassette, are available for PET 2001, TRS-80, and Apple II microcomputers from Pacific Learning Institute, 2426 West 33rd Avenue, Vancouver, B.C. V6M 1C9:

- Typing Drill
- Introduction to the BASIC Language
- Printing of Mailing Labels
- Simulation of a Cash Register
- Accounts Receivable
- A Restaurant Billing System
- School Cafeteria Inventory
- Absentee Recording
- A Centralized Billing System
- The Design of a Teaching Program

The following computer teaching projects listed in the Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing are available for PET Commodore and TRS-80 microcomputers. Send one 5 1/4 inch, double density, single sided floppy diskette to Curriculum Development and Implementation Branch, Room 411, 1181 Portage Avenue, Winnipeg R3G 0T3, for copies of the projects.

Computer Teaching Projects from Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing

- Project 7, Chapter 1
- Project 7, Chapter 2
- Project 10, Chapter 3
- Project 11, Chapter 4
- Project 7, Chapter 5
- Project 6, Chapter 6

The following computer teaching projects are available for the PET Commodore and TRS-80 Model III microcomputer. Send two 5 1/4 inch, double density, single sided floppy diskettes to Curriculum Development and Implementation Branch, Room 411, 1181 Portage Avenue, Winnipeg R3G 0T3, for copies of the projects.

1. Teaching Project for PET Commodore

   - Accounts (BASIC, simulates journalizing, posting, and trial balance)

2. Teaching Projects for TRS-80 Model III (BASIC on Discs)

   - Annuity/BAS (Value of an annuity over time taking into account inflation and the desired return)

   - Loan/BAS (Calculates monthly payment and shows month by month analysis of a loan)

   - Payroll/BAS (Very simple payroll application which computes gross pay)

   - Acct 7 (Calculates straight line, double declining, sum of years digit depreciation)

   - Slamort (Calculates mortgages)

The following program material is available from Commodore Business Machines:

Cassette

- Basic BASIC (ten lessons)

The following programs are available on the Manitoba Schools Computer Network Library. Refer to the Programme Library Users' Manual for information.

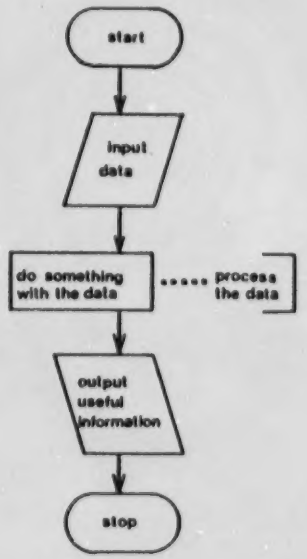
- ANNUITC (calculates payment and withdrawal annuities)
- CARDIAC (simulates a simple machine language)
- FINANC (accepts before-closing balances from the general ledger and produces a trial balance)
- INTIC (compares simple and compound interest)
- INT2C (determines the value of an investment made on a regular basis)
- LABELC (prints address labels)
- MORTC (calculates mortgage schedules)
- PAYC (calculates payroll)
- SMPINTC (calculates simple interest on a yearly or monthly basis)

data processing 302

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
I. REVIEW AND PROGRAMMING - 30% A. Review of Data Processing 202 The student should be able to: 1. apply the concepts, skills and objectives of Historical Development and Orientation;	Discuss, review, and give the students opportunities to apply and use the following: a) history of computers and data processing; b) computer/data processing terminology; c) computers and society;	Curriculum Outline for Data Processing 202 The Computer (colour filmstrip, cassette, guide), Prentice-Hall Media Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1-2 Computers: From Pebbles to Programs (filmstrips, cassettes, teacher's guide), Guidance Associates Data Processing Terminology (colour filmstrips, cassettes, program guide), Prentice-Hall Media Computer Terminology, Beginning Level (filmstrip/slide set/videotape), AIM Educational Aids Computer Terminology, Advanced Level (filmstrip/slide set/videotape), AIM Educational Aids Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 13 New Perspectives (video recording and viewer's guide), Fast Forward I Series

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Implications (video recording and viewer's guide), Fast Forword 2 Series
	d) employment and careers;	The Canadian Classification and Dictionary of Occupations, Department of Manpower and Immigration Canada
		Programming Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media
		Data Processing Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media
		Hardware Development and Service Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media
		Peripheral Careers (colour filmstrip, cassette, teacher's guide), Coronet Instructional Media
		The Computer Revolution (colour filmstrip, cassette, guide), Prentice-Hall Media
	e) uses and applications of computers.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 2, 3, and 9
2. apply the concepts, skills, and objectives of Computer Technology in Business;	Review the following concepts, skills, and objectives:	Curriculum Outline for Data Processing 202
	a) overview of computers in business;	Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapters 17, 18, 19, 20, 21, 22

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	b) hardware and peripheral equipment;	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 1, 3, 5, 6, 10 Introduction to Computers: The CPU (colour filmstrips/slides/videotapes and audio cassettes), AIM Educational Aids Computer Hardware (colour filmstrip, cassette, guide), Prentice-Hall Media Computer Software (colour filmstrip, cassette, guide), Prentice-Hall Media
	c) technology in business.	Introduction to Computers and Data Processing, Anaheim Publishing Company, pp. 2.31-2.45
3. use the skills and apply the concepts and objectives of Communication of Information;	Emphasize the importance of communication techniques and systems throughout Data Processing 302. Discuss and review the concepts of communication and data communication systems. Point out the ways and/or have the students collect information about communication between people and computers, peripheral equipment and computers, and computers and computers.	Curriculum Outline for Data Processing 202 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 2, 8
4. apply the concepts, skills, and objectives of Processing Data on a Computer System;	Discuss the relationship of communication and the processing of data on a computer system. Integrate these concepts throughout Data Processing 302. Review and summarize data files, the data processing cycle, data processing functions, and program accessing.	Curriculum Outline for Data Processing 202 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 3 Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Company, Chapter 2

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
5. use the skills and apply the concepts of Problem Solving and Flowcharting;	Integrate problem solving and flowcharting throughout Data Processing 302. Summarize and review the skills for problem solving and flowcharting prior to reviewing the theory of programming and the use of BASIC and other languages. Point out that the greater part of computer time is spent on business computations. Emphasize that work of this nature involves lengthy periods of sorting data, searching the data, and doing calculations. Explain that calculating and printing employee wage statements for a large company is a good example of problem solving/computing by a computer. Inform the students that when a computer does work of this type, it is said to be engaged in DATA PROCESSING. Have the students study and discuss the flowchart at right, illustrating the meaning of data processing.	Programming Logic: Use of Flowcharts (colour filmstrip, cassette, guide), Prentice-Hall Media Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 10 and 11, pp. A.2-A.3, and Figure 10-8 Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 13 THE MEANING OF DATA PROCESSING 

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
6. apply the introductory theory and skills for programming and programming languages;	Summarize and review the purpose of programs, programming, and programming languages, as applicable to introductory programming.	Curriculum Outline for Data Processing 202 Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapters 11, 12, and Appendix A Writing a Program (colour filmstrip, cassette, guide), Prentice-Hall Media
	Discuss the relationship of programming and programming languages to computers and peripherals.	Computers: Peripherals and Programming (colour filmstrip/cassette/slide set/videotape), AIM Educational Aids Programming Languages (colour filmstrip, cassette, guide), Prentice-Hall Media
7. use the skills and apply the concepts of Introduction to Computer Business Applications.	Review how businesses use programs to solve problems and how computer application criteria relate to the solving of problems by means of programs. Discuss and have the students use pre-written programs to simulate business applications.	Curriculum Outline for Data Processing 202 PROJECTS FROM CURRICULUM OUTLINE FOR DATA PROCESSING 202 1. Projects for PET Commodore 2. Projects for TRS-80 Model III 3. Projects from Pacific Learning Institute 4. Programs for Manitoba Schools Computer Network
B. Programming in BASIC The student should be able to:		
1. explain the purpose of the ten BASIC commands from Data Processing 202;	Identify and review the purpose of the BASIC commands from Data Processing 202.	BASIC COMMANDS FROM DATA PROCESSING 202 1. REM 2. END 3. LET 4. PRINT

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		5. GO TO 6. IF 7. READ 8. DATA 9. FOR/NEXT 10. DIM Learning BASIC Fast, rev. ed., Reston Publishing Company, Inc. Programming In BASIC; A Complete Course, Holt, Rinehart and Winston of Canada, Ltd.
2. code and run business programs using the ten BASIC commands from Data Processing 202;	Review and discuss the following: "The greater part of computer time is spent on business computations." Encourage the students to study the business problems, list the problem-solving steps, flowchart the steps, and follow the flowchart to prepare programs in BASIC to solve the simple business problems. Have the students code and run programs to solve simple business problems by using the ten BASIC commands.	Writing a BASIC Program; Elementary BASIC Coding (colour filmstrips, cassettes, guide), Prentice-Hall Media Part I - Getting Started with the Computer, Part II - Mathematical Operations, Part III - Loops and Subroutines, Part IV - Introduction to Orlginal Programming, Part V - Programming Techniques and Flow Charts (colour filmstrips, cassettes, handbook), Coronet Instructional Media
3. recognize the need for additional BASIC commands;	Point out the importance of additional BASIC commands for designing and coding programs to solve business problems and to use the computer effectively.	Elementary BASIC Coding and Advanced BASIC Techniques (colour filmstrips, cassettes, guide), Prentice-Hall Media
4. explain the purpose of the following BASIC commands: GO SUB, RETURN, ON, INPUT, PRINT USING, IMAGE, TAB;	Identify, discuss, and demonstrate the use of each of the BASIC commands. Demonstrate and have the students proceed on a step-by-step basis. Review the rules for writing BASIC statements.	PURPOSES OF BASIC COMMANDS GO SUB: tells the computer to branch to a subroutine RETURN: ends a subroutine and returns the control to the main program

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		ON: allows the computer to branch to one of several statements (ON . . . GO TO) or to select a subroutine from several in the program (ON . . . GO SUB) INPUT: allows the operator to enter data values at a terminal during execution of a program PRINT USING: instructs the computer what to print and which image statement to use IMAGE: provides the format (the pattern) TAB: causes input to be displayed beginning at a specific location Learning BASIC Fast, rev. ed., Reston Publishing Company, Inc. Programming in BASIC; A Complete Course, Holt, Rinehart and Winston of Canada, Ltd.
5. code and run business programs using BASIC commands;	Expand on business programs from Data Processing 202 by incorporating the new commands. Use the chalkboard or overhead and follow a step-by-step procedure to list problem-solving steps, to draw a flowchart of the steps, and to code business programs in BASIC for the various business problems. Discuss and have the students record each step and use each coded program to solve the business problems with computers.	Part I - String Functions, Part II - Data Handling and Arrays, Part III - Computer Graphics, Part IV - Advanced Mathematical Functions (colour filmstrips, cassettes, handbook), Coronet Instructional Media
6. define bug and debugging;	Discuss the terms bug and debugging as they pertain to computer programs.	BUG: An error in a computer program DEBUGGING: The process of finding and correcting bugs in a program

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
7. Identify the forms of errors;	Explain and define syntax error and logic error. Point out that syntax refers to the correct use of the language, and that syntax errors involve such things as missing commas, quotation marks, periods, and brackets; misusing symbols; using variable names in the wrong place; using a command that the computer does not recognize; and other syntax errors.	SYNTAX ERROR: A mistake in the coding of the program LOGIC ERROR: An error in the design of the solution
	Make the students aware that each programming language has its own rules which must be followed for communicating with the computer. Explain that each language has its own compiler or translator and that one of its important functions is to find improper uses of the language, produce a diagnostic report, and thereby aid the writer of the program in correcting the program syntax.	Introduction to Computers and Information Processing, Reston Publishing Company, pp. 261-264
	Emphasize that a program containing a logic error will still execute, but that the solution may be incorrect or incomplete. Point out that to correct an error in logic, the writer of the program must go back to the original plan (such as a list of steps for solving the problem, a flowchart, and/or pseudo-code) and rethink the solution.	The World of Computers and Information Processing, John Wiley and Sons, p. 79 Fundamentals of Data Processing, 2nd ed., South-Western Publishing Co., p. 222 Introduction to Automated Data Processing, 2nd ed., South-Western Publishing Co., p. 160
8. debug programs.	Point out that the first step in debugging a program is to correct the syntax errors because they are the easiest to locate and to correct. Explain that after the correction of syntax errors, the writer of the program should proceed to the more important aspect of debugging: correction of logic errors.	Computer Programming Errors: Debugging (colour filmstrip, cassette, guide), Educational Activities, Inc.
	Give the students copies of BASIC programming segments and/or programs which contain errors. Have the students detect and correct the errors	BASIC programming segments and programs with syntax and logic errors

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	In these segments/programs and in the programs which they have written.	
C. Other Programming Languages The student should be able to:		
1. describe the nature, advantages, disadvantages, and uses of COBOL, PASCAL, FORTRAN, and/or other languages; 2. compare COBOL, PASCAL, FORTRAN, and/or other languages;	Locate and/or have the students locate examples of computer programs written in the various programming languages. Have the students collect information about the various languages and prepare an illustrated comparative report about the nature, advantages, disadvantages and uses of each language. If a structured compiler is available give the students examples of structured programming.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 12 Fundamentals in Data Processing, 2nd ed., South-Western Publishing Company, Chapters 10, 11 Data Processing with Applications, Reston Publishing Company, Inc., Chapters 12-16 Introduction to Automated Data Processing, South-Western Publishing Company, Chapters 9-14 Introduction to Computers and Information Processing, Reston Publishing Company, Inc., Chapters 14, 15
3. read and explain programs written in other languages, preferably COBOL.	Have the students study, read, and explain other languages, preferably COBOL. Make the students aware of the use and application of COBOL in computer programs to solve business problems. Point out that it is not necessary to code and run programs in other languages. However, if time is available, encourage the students to code and run some business programs in languages other than BASIC.	Programming Languages, Writing a Program, Programming Logic: Use of Flowcharts, Programming Routines, Advanced Programming Techniques (colour filmstrips, cassettes, guide), Prentice-Hall Media Programming in COBOL-Introduction, The First Three Divisions, The Procedure Division, Routines, Processing Tables (colour filmstrips, cassettes, guide), Prentice-Hall Media

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
II. BUSINESS APPLICATIONS - 70% A. Orientation The student should be able to:	NOTE: Students should attempt a minimum of seven business applications (B to H). If time is available, the students should have the opportunity to complete more of these applications.	
1. recognize the applications of computers in modern business;	Emphasize that computers have unlimited applications in many types of businesses. Make the students aware of the scope of the applications which extend from functions of accounting to designing and the control of products being manufactured. Point out the reasons for the use of a computer in business.	REASONS FOR BUSINESS USE OF COMPUTERS 1. Reduction of costs 2. Assistance with production of timely and accurate information 3. Improvement of customer service
2. identify business applications of computers;	Discuss, list, and describe the main types of business applications. Have the students collect information from textbook references, software lists, and/or interviews of business representatives to determine the many different types of business applications. Review the concept that business systems are made up of procedures, a series of logical steps. Discuss and ask the students to identify procedures for a payroll application, accounts receivable application, and others.	SYSTEMS OF ACCOUNTING APPLICATIONS 1. Accounts receivable 2. Accounts payable 3. Payroll 4. Order entry 5. General ledger 6. Inventory control 7. Other SYSTEMS OF BUSINESS APPLICATIONS 1. Mailing lists 2. Records managements 3. Word processing 4. Real estate listings 5. Transportation reservations/ scheduling 6. Stock market listings and records 7. Bank records and calculations 8. Economic forecasting and analysis 9. Marketing analysis and research 10. Other

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
3. explain the characteristics of the accounting systems;	Discuss, list, and have the students research and prepare illustrated reports and bulletin board displays or charts about the characteristics of accounting systems. Show and discuss the filmstrips and review related information from an accounting textbook to help the students to understand the integration of accounting/business procedures with data processing procedures. Point out the following: a) all businesses process data; b) every business uses some form of data processing system to record and report its operations; c) it is important for any business to obtain accurate and up-to-date information quickly and economically; d) the size of a business influences the method of processing data.	Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 10 The Computer, Data Entry, Computer Output, The Computer and Business Management (filmstrips, cassettes), Gage Educational Publishing, Ltd. Century 21 Accounting, Canadian ed., Gage Educational Publishing, Ltd., Chapters 18, 19, 20
4. identify the phases of a data processing system for accounting applications.	List and discuss the similarities of the phases of a system for manual data processing and automated data processing. Define and give examples of each phase, and have the students prepare labelled charts, posters, or bulletin board displays illustrating each phase. Emphasize the following examples: a) input: data on purchase invoices, sales, invoices, memoranda, and other business forms; b) processing: manipulation of data by adding, subtracting, multiplying, dividing, and other methods; c) storage: filing cabinets, card indexes, tapes (cassette, reel-to-reel), cards,	PHASES OF A DATA PROCESSING SYSTEM 1. Input 2. Processing 3. Storage 4. Output INPUT: Data that are received and put into a system PROCESSING: Working with data according to precise procedures STORAGE: Filing or holding data until they are needed OUTPUT: Information produced by a data processing system

159

160

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	discs, and other methods; d) output: facts about assets, liabilities, capital, revenue, expenses, reported on financial statements and printed on cheques, invoices, and other forms.	
B. Mailing, Address, and Membership Lists The student should be able to:		
1. explain the purpose of mailing, address, and membership lists;	Discuss the uses businesses and other organizations make of mailing, address, and membership lists.	
2. describe the structure and content of mailing, address, and membership lists;	Explain the structure and content of mailing, address, and membership lists. Locate and/or have the students locate examples of these lists and prepare bulletin board displays of lists or files generated manually and by computer.	Bulletin board display of various types of mailing, address, and membership lists
3. explain the procedure for computerizing mailing, address, and membership lists;	Have the students prepare a list and a flowchart of problem-solving steps, and ask them to write a program in BASIC to computerize a mailing, address, or membership list.	
4. run a mailing, address, or membership program and produce output.	Discuss possible sources of data for the compilation of information pertinent to mailing, address, and membership lists. Have the students complete the following: a) Create a master file. b) Prepare and produce sample address labels and/or lists. c) Make additions, deletions, and other changes to the master file. d) Destroy the file when finished.	SOURCES OF DATA FOR MAILING, ADDRESS, AND MEMBERSHIP LISTS 1. Telephone directories 2. City directories 3. Class lists 4. List of members of an organization/club Refer to bibliography for software for a mailing list. Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing, Anaheim Publishing Company, Chapter 10, Project 1

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
C. Payroll System The student should be able to:		
1. define payroll;	Discuss and describe a payroll.	PAYROLL: A list of employees that shows payments due them for a pay period
2. explain the purpose of a payroll system;	Define payroll system. Point out that the main objectives of a payroll system are the following: a) to ensure prompt and accurate payment of employees; b) to provide accurate reports to employees, employer, and government agencies about money paid to employees; c) to compute and report accurately the various types of payroll deductions.	PAYROLL SYSTEM: The system used to pay employees for services rendered
3. describe the structure and content of a payroll system;	Discuss and have the students identify the components and organization of a payroll system. Bring to class or have the students bring examples of payrolls and related forms, and have them prepare bulletin board displays of payrolls prepared manually and by computer.	Bulletin board display of various types of payrolls and related forms Century 21 Accounting, Canadian ed., Gage Educational Publishing, Ltd., Chapters 21, 22
4. explain the procedure for computerizing a payroll system;	Point out that the payroll system was one of the first business applications to be computerized. Explain the following: a) Payroll systems vary according to the size and type of business. b) Payroll systems produce pay cheques, payroll registers, deduction registers, employees' earnings records, as well as a number of payroll analysis reports. Have the students prepare a list and a flowchart of problem-solving steps, and ask them to write a program in BASIC to computerize a payroll system. Begin with a simple system and move gradually to more complex systems.	Data Processing with Applications, Reston Publishing Company, Inc., Chapter 17 Accounting: A Systems Approach, McGraw-Hill Ryerson, Ltd., Chapter 10 Basic Accounting, Copp Clark Pitman, Chapter 15 Century 21 Accounting, Canadian ed., Gage Educational Publishing, Ltd., Chapters 21, 22

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		Century 21 Accounting; Advanced Course, Canadian ed., Gage Educational Publishing Ltd., Chapter 10
5. run a payroll program and produce output.	Explain, demonstrate and have the students complete the following: a) input company master information, employee master information, and employee detail information; b) produce a payroll register, pay cheques, employee's earnings record, and other forms/reports; c) produce year-end information. Make the students aware of procedures for electronic fund transfer and financial reporting to government offices.	Refer to bibliography for software and programs for payroll systems
D. Accounts Receivable System The student should be able to:		
1. define accounts receivable;	Discuss and explain the term accounts receivable. Make the students aware of the relationship between accounts receivable and an accounts receivable ledger. Show the students examples of accounts receivable ledgers and related business papers.	ACCOUNTS RECEIVABLE: Money owed by customers of a company for merchandise sold or for services rendered on a charge basis or the process of recording the amount due a company from sales on account ACCOUNTS RECEIVABLE LEDGER: A book that contains the balances and activities of a company's sales on account
2. explain the purpose of an accounts receivable system;	Make the students aware that 80 to 90 percent of business conducted in Canada operates on a credit basis. Point out the following: a) Accounts receivable systems are an impor-	Introduction to Computers and Data Processing; Transparency Masters, Anaheim Publishing Company, Figure 10-19

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	tant part of business organizations and records. b) Keeping track of how much each customer owes is essential to a profitable business. c) Businesses must know when payments are due from customers and must be able to take steps to expedite payments. d) Accounts receivable systems determine customer balances. Explain that an accounts receivable system must provide for the following: a) prompt billing of customers; b) accurate accounting of merchandise or services purchased by the customers; c) recording of payments received and balances due from customers; d) prompt notification to the business about slow-paying or delinquent customers.	
3. describe the content and structure of an accounts receivable system;	Explain that in its simplest form, an accounts receivable system has the following main components: a) the balance brought forward from a previous period; b) sales on account, which increase the balance owed; c) payment received, which decreases the balance owed. Point out that more complex forms of accounts receivable systems have additional components. Discuss and have the students research and identify these components.	Accounting: A Systems Approach, McGraw-Hill Ryerson, Limited, Chapters 11-14 Basic Accounting, Copp Clark Pitman, Chapters 8-12, Project 2 Century 21 Accounting, Canadian ed., Gage Educational Publishing, Ltd., Chapters 18-20, 23-24, Project 3
4. identify the basic procedures for accounts receivable systems;	List and explain the basic procedures which are applicable to manual and computerized accounts receivable systems. Show the students examples of the forms used for these procedures, and explain how the forms relate to the accounts receivable system and the records maintained by the system.	BASIC PROCEDURES FOR AN ACCOUNTS RECEIVABLE SYSTEM 1. Establishment of customer accounts with credit limits 2. Maintenance of a record of all sales to and payments

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		by customers 3. Preparation of billing statements for customers when payments are due 4. Recording promptly the payments made by customers 5. Preparation of reports on aging accounts 6. Follow-up of delinquent accounts
5. explain the procedure for computerizing an accounts receivable system;	Review the basic procedures for accounts receivable systems. Work with the students to prepare a list of problem-solving steps and a flowchart for the computerizing of an accounts receivable system. Develop the problem-solving steps and the flowchart on a step-by-step basis. Ask the students to follow the problem-solving steps and the flowchart to write a program in BASIC to computerize a simple accounts receivable system. Encourage the students to work on more complex accounts receivable systems. Have the students discuss and study the flow chart of Accounts Receivable Steps. Identify the forms related to each step, develop an awareness of the data/information on each form, and note the methods of recording information in each of the steps. Ask the students to compare manual and automated methods for handling accounts receivable systems.	Refer to Transparency Master No. 7, Accounts Receivable Steps Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 17
6. run an accounts receivable program and produce output.	Explain, demonstrate, and have the students complete the following: a) initialize company information (date, name, address); b) create customer files; c) produce and record invoices; d) record cash receipts;	Refer to bibliography for software and programs for an accounts receivable system.

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	e) prepare statements of accounts and other documents. Discuss the electronic transfer of data/information and funds.	
E. Accounts Payable System The student should be able to:		
1. define accounts payable;	Discuss and explain the term accounts payable. Make the students aware of the relationship between accounts payable and an accounts receivable ledger. Show the students examples of accounts payable ledgers and related business papers.	ACCOUNTS PAYABLE: The amount of money a company owes to other companies in payment of bills for merchandise or services or the process of recording and paying for purchases on account ACCOUNTS PAYABLE LEDGER: A book that contains the balances and activities of a company's purchases on account
2. explain the purpose of an accounts payable system;	Explain that accounts payable and accounts receivable systems are similar in many ways. Point out the following: a) Accounts payable systems are an important facet of business organization and records. b) Keeping track of how much a business owes to other companies is essential to effective operation of the business. c) Businesses must know when payments should be made on invoices received from other companies, and must be able to take steps to expedite these payments. d) Accounts payable systems determine balances owing to other companies. e) Accounts payable systems provide information about how much was paid, what departments in the business made the expenditure, to whom the expenditure was paid and for what purpose.	Introduction to Computers and Data Processing: Transparency Masters, Anaheim Publishing Company, Figure 10-20

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	Explain that an accounts payable system must provide for the following: a) prompt payment of bills to take advantage of discounts and to establish and to maintain a good credit rating; b) accurate accounting of merchandise or services purchased by the business; c) recording of payments made on bills and the balances due to the companies from which goods and services were purchased. Emphasize that the two major functions of an accounts payable system are the payment of bills and the assignment of charges to various departments of a business.	
3. describe the content and structure of an accounts payable system;	Explain that an accounts payable system, in its simplest form, has the following main components: a) the balance brought forward from a previous period; b) purchases on account from companies, which increase the balance owed; c) payment made to companies, which decreases the balance owed by the business. Point out that more complex forms of accounts payable systems have additional components. Discuss and have the students research and identify these components.	Accounting: A Systems Approach, McGraw-Hill Ryerson, Ltd., Chapters 11-14 Basic Accounting, Copp Clark Pitman, Chapters 8-12, Project 2 Century 21 Accounting, Canadian ed., Gage Educational Publishing, Ltd., Chapters 18-20, 23-24, Project 3
4. identify the basic procedures for accounts payable systems;	List and explain the basic procedures which are applicable to manual and computerized accounts payable systems. Show the students examples of the forms used for these procedures, and explain how the forms relate to the accounts payable system and the records maintained by the system.	BASIC PROCEDURES FOR AN ACCOUNTS PAYABLE SYSTEM 1. Establishment of creditor accounts 2. Maintenance of a record of all purchases from and payments to creditors 3. Calculation of discounts and payment date

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
		4. Recording promptly payments made to creditors 5. Preparation of reports on outstanding accounts 6. Follow-up on outstanding accounts
5. Identify the output from accounts payable systems;	Discuss and explain the relationship of various types of output to the basic procedures for an accounts payable system. Locate examples or have the students locate examples and prepare a bulletin board display of the various types of output.	TYPES OF OUTPUT FOR AN ACCOUNTS PAYABLE SYSTEM 1. Cheques payable to creditors and vendors 2. Accounts payable register 3. Chart of accounts listing the departments spending the money on purchases 4. Accounts payable aged trial balance indicating money owed to creditors/vendors
6. explain the procedure for computerizing an accounts payable system;	Review the basic procedures for and the output from accounts payable systems. Work with the students to prepare a list of problem-solving steps and a flowchart for the computerizing of an accounts payable system. Develop the problem-solving steps and the flowchart on a step-by-step basis. Ask the students to follow the problem-solving steps and the flowchart to write a program in BASIC to computerize a simple accounts payable system. Encourage the students to work on more complex accounts payable systems. Have the students study and discuss the flowchart of Accounts Payable Steps, identify the forms related to each step, develop an awareness of the data/information on each form, and note the methods of recording information in each of the steps. Ask the students to compare manual and automated methods for processing data in accounts payable systems.	Refer to Transparency Master No. 8, Accounts Payable Steps Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 19

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
7. run an accounts payable program and produce output.	Explain, demonstrate, and have the students complete the following: a) input company master information; b) create creditor/vendor files; c) record purchase invoice; d) prepare and record payments; e) prepare schedule of accounts payable and other documents. Discuss the electronic transfer of data/information and funds. Emphasize that accounts payable processing is important because businesses and organizations must be knowledgeable of where their money is being spent and whether they are using their money in the most profitable way.	Refer to bibliography for software and programs for an accounts payable system
F. Inventory System The student should be able to:		
1. define <u>inventory</u>;	Discuss and explain the term <u>inventory</u>. Make the students aware of the relationship of inventory to accounts payable and accounts receivable.	<u>INVENTORY</u>: The process of determining, and/or the record maintained of the number and cost of items an organization has in stock
2. recognize the various types of inventory systems;	Have the students collect information about, define, and prepare illustrated reports on the various types of inventory systems.	<u>TYPES OF INVENTORY SYSTEMS</u> 1. Periodic Inventory 2. Perpetual Inventory <u>PERIODIC INVENTORY</u>: Merchandise inventory determined by counting, weighing, or measuring the items of merchandise on hand--sometimes called physical inventory <u>PERPETUAL INVENTORY</u>: Merchandise inventory determined by keeping a continuous record of the increase, the decrease, and the balance on hand--sometimes called book inventory

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
3. explain the purpose of an inventory system;	Make the students aware that different types of businesses make use of an inventory system for a variety of purposes. Some examples are the following: a) Wholesale distributors and retail stores keep a record of merchandise available to customers. b) Airlines prepare inventories of reservations. c) Banks maintain inventories of account balances. Point out that all types of businesses use the same general principles for maintaining inventory systems. Emphasize that the basic purposes of an inventory system are as follows: a) to maintain inventory at a proper level to meet customer requirements; b) to ensure that the business has a minimum investment in the inventory.	
4. describe the content and structure of an inventory system;	Review the definitions of inventory, perpetual inventory, and periodic inventory. Discuss the following concepts related to inventory systems: a) Inventory balances increase when a business purchases items. b) Inventory balances decrease when a business sells items. c) Sales returns increase inventory balances. d) Purchases returns, spoilage, and pilferage decrease inventory balances. Point out that an inventory system has the following main components: a) item number; b) item description; c) quantity on hand; d) quantity on order;	Introduction to Computers and Data Processing: Transparency Masters, Anaheim Publishing Company, Figure 10-18 Accounting: A Systems Approach, McGraw-Hill Ryerson, Ltd., Chapters 11, 15 Basic Accounting, Copp Clark Pitman, Chapter 19

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	e) quantity reserved for use; f) unit cost; g) unit price; h) minimum allowable inventory balances. Explain that more complex forms of inventory systems have additional components. Discuss and have the students research and identify these components.	Elements of Accounting: A Senior Course, 2nd ed., McGraw-Hill Ryerson, Ltd., Chapter 7
5. identify the basic procedures for inventory systems;	List and explain the basic procedures which are applicable to manual and computerized inventory systems. Show the students examples of forms and input used for these procedures and explain how the forms relate to the inventory system and the records maintained by the system. Discuss, with the aid of diagrams, the influence of the accounts receivable system and the accounts payable system on the inventory system.	SOURCES OF INPUT 1. Accounts receivable invoices for stock deletions 2. Accounts payable invoices for stock additions 3. Adjustment coding sheets for cash sales, cash purchases, and physical inventories
6. identify the output from inventory systems;	Discuss and explain the relationship of various types of output to the basic procedures for an inventory system. Locate and/or have the students locate and prepare charts, posters, or bulletin board displays of the various types of output.	TYPES OF OUTPUT FOR AN INVENTORY SYSTEM 1. Stock (inventory) status reports 2. Inventory exception reports 3. Analysis reports for high turnover and slow moving items 4. Periodic sales reports 5. Other reports
7. explain the procedure for computerizing an inventory system;	Discuss and have the students explain the procedure for computerizing a simple inventory system by preparing a list of problem-solving steps and flowchart/s. Request the students to follow the problem-solving steps and the flowchart to write a program in BASIC to computerize a simple inventory system. Encourage the students to complete more complex projects. Have the students compare manual and automated methods for processing data in inventory systems.	Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 18

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
8. run an inventory program and produce output.	Explain, demonstrate, and have the students complete the following: a) create a master file; b) record changes in inventory resulting from sales, purchases, losses, sales returns, and purchases returns; c) prepare reports from the program/s.	Refer to bibliography for software and programs for an inventory system.
G. General Ledger System The student should be able to:		
1. define general ledger;	Discuss and explain the term general ledger.	GENERAL LEDGER: The system used to provide a complete record of all of the financial transactions of a business
2. explain the purpose of a general ledger system;	Emphasize the importance of maintaining a general ledger system for the purpose of recording data and information related to all the financial transactions of a business.	
3. describe the structure and content of a general ledger system;	Review the definition of a general ledger and the purpose of a general ledger system. Emphasize that a general ledger system uses data from many other accounting systems. Discuss the relationship of the general ledger system to sales, purchases, accounts receivable, accounts payable, inventory, and payroll. Point out that the basic elements of a general ledger system relate to the posting and transferring of all financial transactions to an accounting data base.	Century 21 Accounting, Canadian ed., Gage Educational Publishing Ltd., Chapters 18-20 Elements of Accounting: A Senior Course, 2nd ed., McGraw-Hill Ryerson, Chapter 5 Century 21 Accounting: Advanced Course, Gage Educational Publishing Ltd., Chapters 2-3
4. identify the procedure for computerizing general ledger systems;	Show the students and/or have them collect examples of general ledger systems. Diagram and/or have the students prepare diagram/s to illustrate the relationship between the general ledger system and other accounting systems. Encourage the students to use the diagram as an aid in the writing of a program in BASIC	Computer Augmented Accounting: Compu-Guide One, 3rd ed., South-Western Publishing Co.

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	to computerize simple and more complex general ledger systems. Discuss the output a business can obtain from a general ledger system. Emphasize the following main types of output: income statement and balance sheet. Explain the purpose of each of these types of output. Prepare and/or have the students prepare charts, posters, or bulletin board displays of examples of income statements and balance sheets. Have the students compare manual and automated methods for processing data in general ledger systems.	
5. run a general ledger program and produce output.	Explain, demonstrate, and have the students complete the following: a) enter company master information; b) enter account numbers and names; c) enter a variety of accounting transactions; d) prepare trial balance, income statement, balance sheet and other reports available from the program/s.	Refer to bibliography for software and programs for general ledger system.
H. Other Business Applications The student should be able to:	NOTE: Complete two business applications from this section. If time is available the students should have the opportunity to complete more of these applications.	
I. recognize other business applications;	Identify and show the students examples of the following business applications: a) word processing; b) records management; c) manufacturing inventory; d) fixed asset inventory; e) financial mathematics (amortization schedules, depreciation, simple and compound interest); f) business simulations (economics, agribusiness, real estate, insurance, airline,	Examples of business applications Accounting textbooks Business, financial, and mathematics textbooks Data Processing with Applications, 2nd ed., Reston Publishing Company, Inc., Chapter 20

GOALS AND OBJECTIVES	TEACHER'S NOTES AND SUGGESTED ACTIVITIES	REFERENCE AND SUPPORT MATERIAL
	stock market applications, marketing applications).	
2. explain the purpose of the business applications;	Have the students explain the uses businesses make of the business applications.	
3. describe the structure and the content of the business applications;	Have the students locate examples of the business applications, list problem-solving steps, prepare flowcharts, and follow the problem-solving steps and flowcharts to write programs in BASIC to computerize the applications. Encourage the students to complete simple and complex projects. Arrange tours to obtain and/or invite guest speakers to provide information about the computerizing of business applications.	
4. run a program and produce output for the business applications.	Explain, demonstrate, and have the students run and produce output for two business applications.	Refer to bibliography for software/programs for business applications.

BIBLIOGRAPHY

Data Processing 302

Textbooks

De Rossi, Claude. Learning BASIC Fast. rev. ed. Reston, Virginia: Reston Publishing Company, Inc., 1979. (Distributed by Prentice-Hall Canada, Incorporated.)

Pillsbury, Wilbur, F. Computer Augmented Accounting: CompuGuide One. 3rd ed. Cincinnati, Ohio: South-Western Publishing Company, 1979.

Shelly, Gary B., and Thomas J. Cashman. Introduction to Computers and Data Processing. Fullerton, Calif.: Anaheim Publishing Company, 1980.

Stern, Nancy B., and Robert A. Stern. COBOL Programming. 2nd ed. Toronto, Ontario: John Wiley and Sons, Inc., 1975.

Reference Books

D'Amico, Victor L., and Maurice D. Obonsawin. Basic Accou ing. Toronto, Ontario: Copp Clark Pitman, 1978.

Kaluza, M. J. Accounting: A Systems Approach. Scarborough, Ontario: McGraw-Hill Ryerson, Ltd., 1976.

Kaluza, M. J., and W. G. Leonard. Elements of Accounting: A Senior Course. 2nd ed. Scarborough, Ontario: McGraw-Hill Ryerson, Ltd., 1979.

Landry, P., et al. Century 21 Accounting: Advanced Course. Canadian ed. Agincourt, Ontario: Gage Educational Publishing, Ltd., 1978.

Pansegrau, Gary E., et al. Century 21 Accounting. Canadian ed. Agincourt, Ontario: Gage Educational Publishing, Ltd., 1978.

Pillsbury, Wilbur F. Instructor's Manual: Computer Augmented Accounting: CompuGuide One. 3rd ed. Cincinnati, Ohio: South-Western Publishing Company, 1979.

Stern, Nancy B., and Robert A. Stern. Instructor's Manual: COBOL Programming. 2nd ed. Toronto, Ontario: John Wiley and Sons, 1975.

Note: For additional reference works, refer to the bibliography for Data Processing 202.

Periodicals

Refer to bibliography for Data Processing 202.

Audio-Visual Materials

The following audio-visual materials are available from Coronet Instructional Media, Ltd., 200 Steelcase Road East, Markham, Ontario L3R 1G2.

I. Filmstrips with Cassettes and Handbook

a) Advanced BASIC Techniques
- String Functions (Part I)
- Data Handling and Arrays (Part II)
- Computer Graphics (Part III)
- Advanced Mathematical Functions (Part IV)

The following audio-visual materials are available from Prentice-Hall Media, 1870 Birchmount Road, Scarborough, Ontario M1P 2J7:

I. Colour Filmstrips with Cassettes and Program Guides

a) Computer Programming

i) Introduction to Programming
- Advanced Programming Techniques

ii) Programming in BASIC
- Advanced BASIC Techniques

iii) Programming in COBOL
- Introduction
- The First Three Divisions
- The Procedure Division
- Routines
- Processing Tables

2. Colour Filmstrips with Cassettes, Program Guides, and Reproducible Masters

a) Word Processing

i) An Introduction to Word Processing

- The Need for Word Processing
- Technical Developments
- Office Automation

ii) Generating Documents

- Short and Major Documents
- Standard Documents, Repetitive Documents and Forms

iii) Keyboarding and Editing

- Keyboarding Short Documents
- Keyboarding Major Documents
- Keyboarding Standard Documents
- Keyboarding Repetitive Documents and Forms

iv) Distribution and Retention

- Document Distribution
- Document Retention

Note: For additional audio-visual materials refer to the bibliography for Data Processing 202.

Programs and Software

The following computer teaching projects listed in the Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing are available for PET Commodore and TRS-80 microcomputers. Send one 5 1/4 inch, double density, single sided diskette to Curriculum Development and Implementation Branch, Room 411, 1181 Portage Avenue, Winnipeg R3G 0T3, for copies of the projects.

Computer Teaching Projects from Student Workbook and Study Guide to Accompany Introduction to Computers and Data Processing

- Project 7, Chapter 8
- Project 11, Chapter 7

The following programs are available on the Manitoba Schools Computer Network Library. Refer to The Programme Library Users' Manual for information:

- CAA (runs programs for Computer Augmented Accounting)
- CAA2 (alternate version of CAA that allows for the saving of disk files)
- CODOLP (inserts a file and then compiles and executes a COBOL program)
- ECO2C (plots supply and demand curves with calculations of equilibrium position and elasticities of the curve)
- TRUINTC (calculates true annual interest rate by means of convergence)
- FARMP (simulates a prairie grain farm in Canada)
- FARMFIX (teacher program to allow changes to FARM data files)

The following software packages for TRS-80, Apple, and PET microcomputers are available from and are described in a catalogue from Micro Learningwave, P.O. Box 2134, N. Mankato, Minnesota 56001:

1. TRS-80 Business Package I (ED003) (diskette or cassette tape)

   - Accounting I
   - Accounting II
   - General Ledger
   - Depreciation

2. TRS-80 Business Package II (ED004) (diskette or cassette tape)

   - Annuities
   - Loan Amortization
   - Bank Reconciliation
   - Stock Market Simulation

3. TRS-80 Business Package III (ED013) (diskette or cassette tape)

   - Chart of Accounts Entry
   - Journal Entry
   - Report Print

4. TRS-80 Computerized Farm Records (018)

   - Farmware

5. Apple II Business Package I (AP051) (diskette)

   - Loan Amortization
   - Bank Reconciliation
   - Stock Market Simulation
   - Depreciation

6. Apple II Business Package III (AP052) (diskette)

   - Chart of Accounts Entry
   - Journal Entry
   - Report Print

7. Apple II Computerized Farm Records (AP054) (diskette)

   - Farmware

8. PET Business Package I (PT003) (cassette tape)

   - General Ledger
   - Depreciation

9. PET Business Package II (PT004) (cassette tape)

   - Annuities
   - Loan Amortization
   - Bank Reconciliation
   - Stock Market Simulation

The following software packages for TRS-80 microcomputer, prepared by Radio Shack, Tandy Corporation, are available from local Radio Shack stores:

- Business Mailing List (26-1558)
- Scripsit Word Processing System (26-1563)
- Profile (26-1562) (accesses names, addresses, accounts, personnel records)

- General Ledger I (26-1552)
- Accounts Receivable (26-1555)
- Accounts Payable (26-1554)
- Disk Payroll (26-8556)
- Inventory Control I (26-1553)
- Manufacturing Inventory Control System (26-1559)
- Fixed Asset Accounting (26-1560)
- Standard and Poor's Stockpack System (26-1507)
- Profile III Plus (26-1592)
- Model III VisiCalc (26-1569)

The following software packages for various types of microcomputers, prepared by BPI Systems, Inc., Austin, Texas, are available from Computerland stores:

1. Apple II Microcomputer (48K)

   General Ledger Accounting System handles general ledger accounts, accounts payable accounts, accounts receivable accounts, payroll accounts, and cash disbursement accounts. This software package consists of a comprehensive manual and the following four disks:

   - Disk No. 1 - The Data Entry Disk has commands for entering data to various journals in the system, printing the journals, posting the ledgers, preparing financial statements, and closing the books.

   - Disk No. 2 - The Posting Disk has commands for posting all entries to the various ledgers after sorting by account number; prints the general ledger, subsidiary ledgers, payroll ledger, profit and loss statement and balance sheet.

   - Disk No. 3 - The Maintenance Disk has commands for opening a new set of books and setting up a new chart of accounts.

   - Disk No. 4 - This is a data disk with a sample business entered on it for a complete set of books.

2. Commodore PET/CBM Microcomputer (32K)

   General Ledger Accounting System is similar to the General Ledger Accounting System for the Apple II Microcomputer. This software package requires a BPI No. 3 chip, and consists of a comprehensive manual and the following three disks:

- Disk No. 1 - The Data Entry Disk
- Disk No. 2 - The Posting Disk
- Disk No. 3 - A Corner Grocery Store is a data disk for a complete set of books.

3. IBM Personal Computer (64K)

General Accounting is similar to the General Ledger Accounting System for the Apple II Microcomputer. This software package consists of a comprehensive manual and the following four disks:

- Disk No. 1 - The Data Entry Disk (6936471)
- Disk No. 2 - The Posting Disk (6936475)
- Disk No. 3 - The Maintenance Disk (6936480)
- Disk No. 4 - Future Corporation Data (6936485) is a data disk for a complete set of books.

The following software package, prepared by Personal Software, Inc., is available from Computerland stores for these microcomputers: Apple II (48K), Commodore PET/CBM (32K), and IBM Personal Computer (64K):

VisiCalc features an electronic worksheet for solving various number problems related to the following business functions:

- Forecasting and projecting: cash flow, sales, inventory, production and purchasing levels, product/market growth, income statements, balance sheets.

- Analyzing: stock fluctuations, profit and loss statements, structural designs, real estate investments, personal expenditures, buy vs. lease, agricultural crop returns.

- Computing: trust fund reports, seller's and buyer's closing costs, pricing, taxes, proposals, job costs and material estimates.

- Planning: new business ventures, budgets, workloads, advertising media schedules, office space expansion, five-year plan, pricing.

The following software is available from Prosoft, Box 839, North Hollywood, Calif. 91603:

Word processing for TRS-80 Models I and III

- New Script

The following word processing package and project is available from Beryl Bingham, Elmwood High School, 505 Chalmers Avenue, Winnipeg, Manitoba R2L 0G4:

- Word Processing for Grade 12 Students Using the Commodore PET Microcomputer

Software packages and program projects are available from the following user groups:*

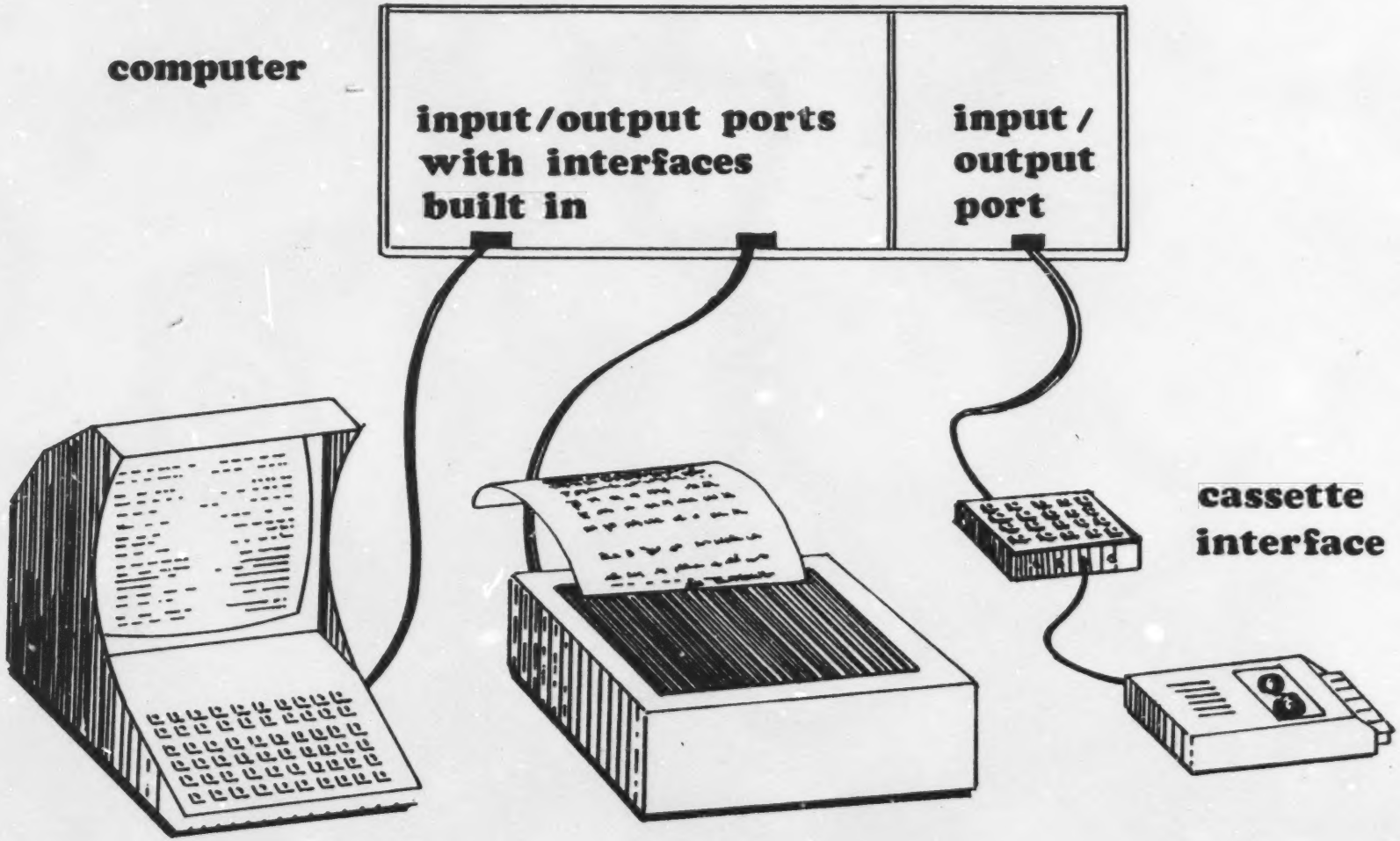
- The Winnipeg Micro-80 User's Group
- Apple User's Group
- PET User's Group

*Information about meeting times and places for the above groups is available by calling 474-8574 or writing to Room 328, Faculty of Education, University of Manitoba, Winnipeg, Manitoba.

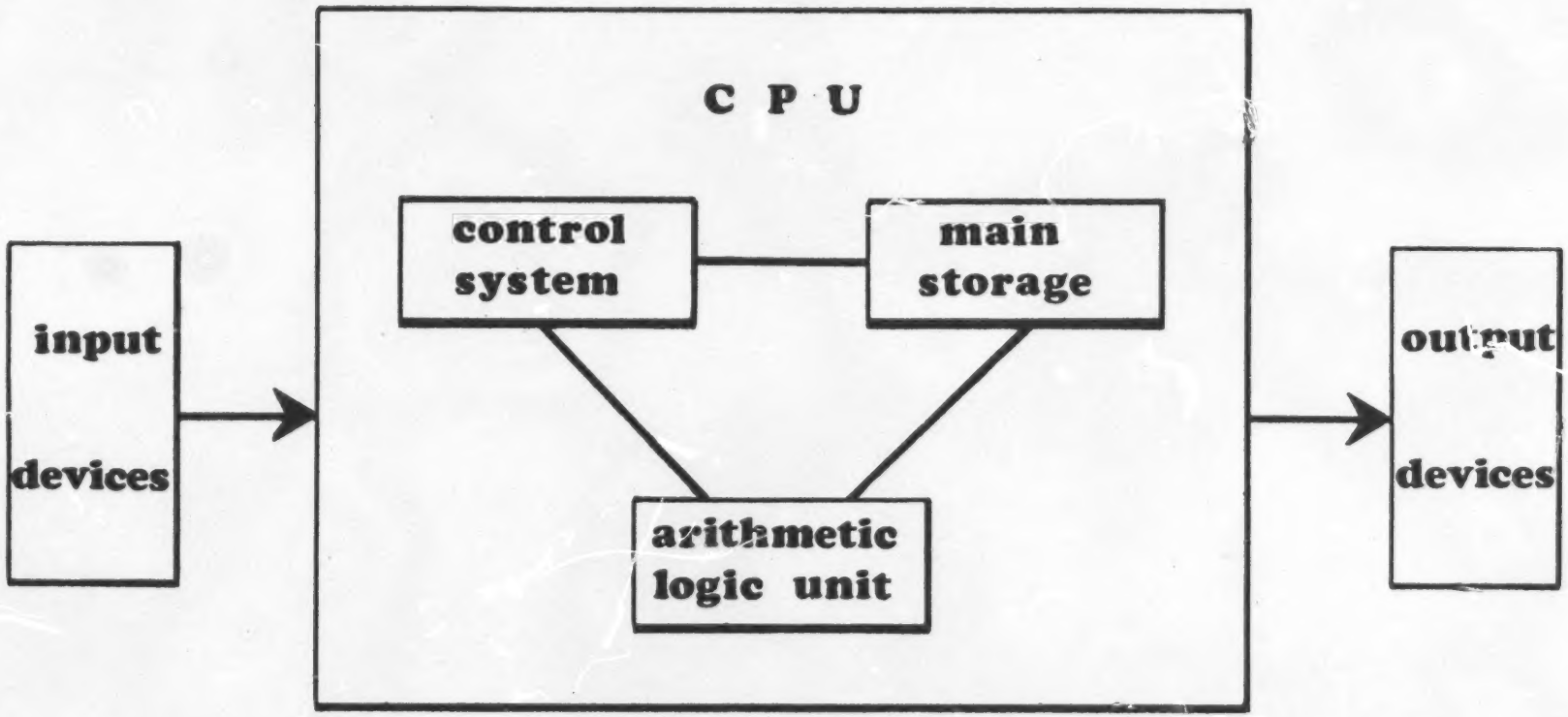
Note: For additional programs software refer to the bibliography for Data Processing 202.

overhead transparency masters

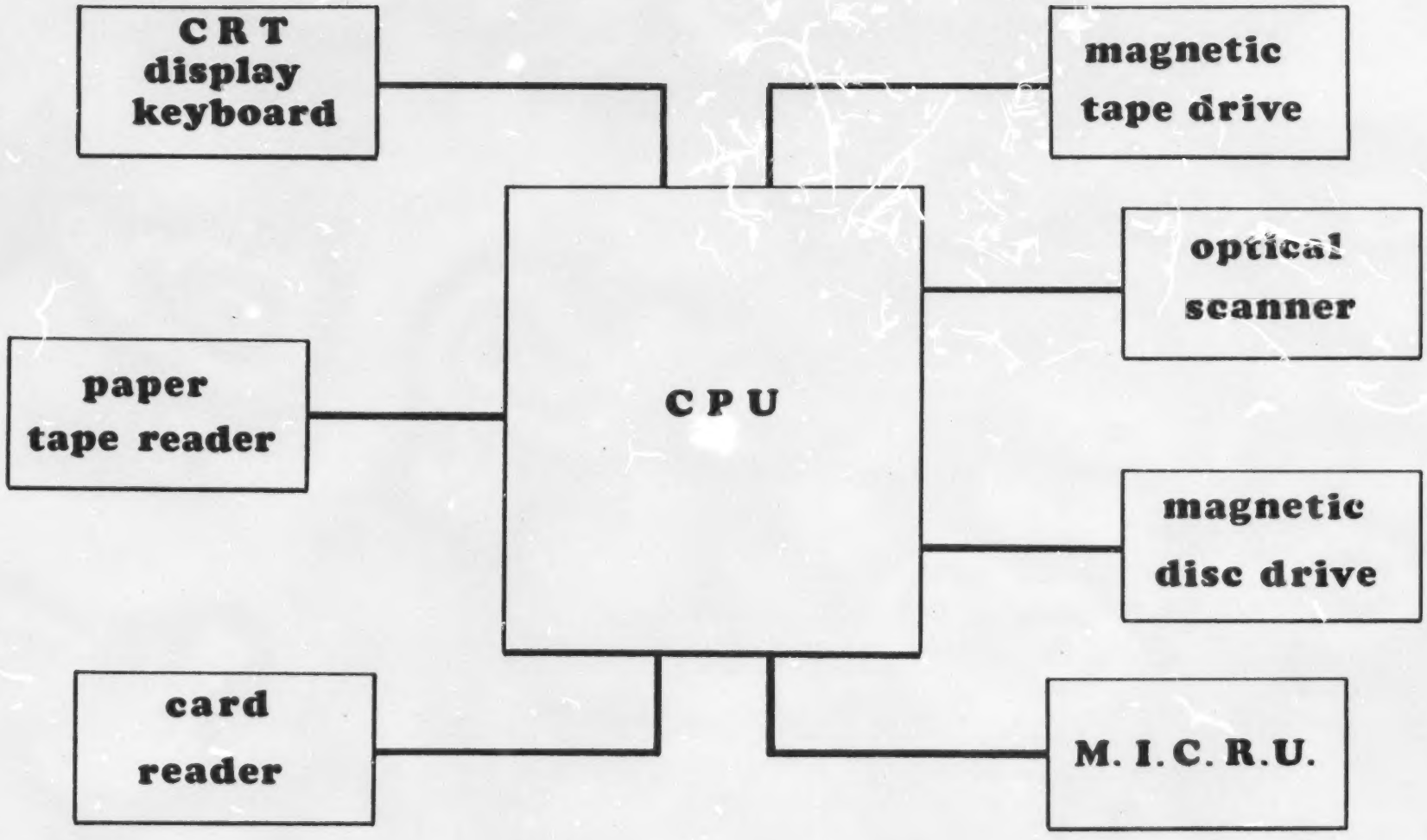
COMPUTER LINKED TO PERIPHERAL DEVICES BY WAY OF INPUT/OUTPUT PORT AND A SUITABLE INTERFACE



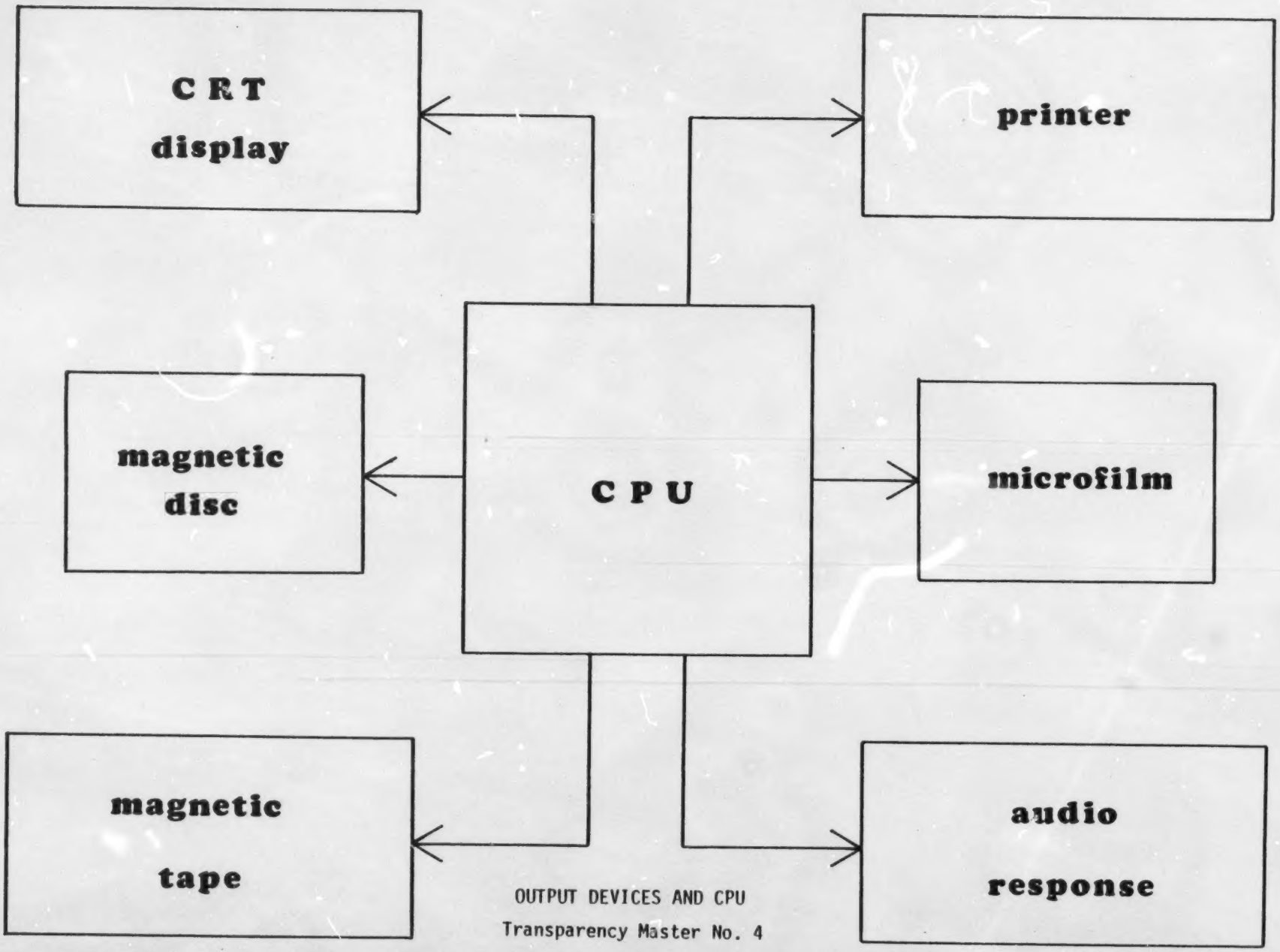
Transparency Master No. 1



COMPONENTS OF COMPUTERS/COMPUTER SYSTEMS

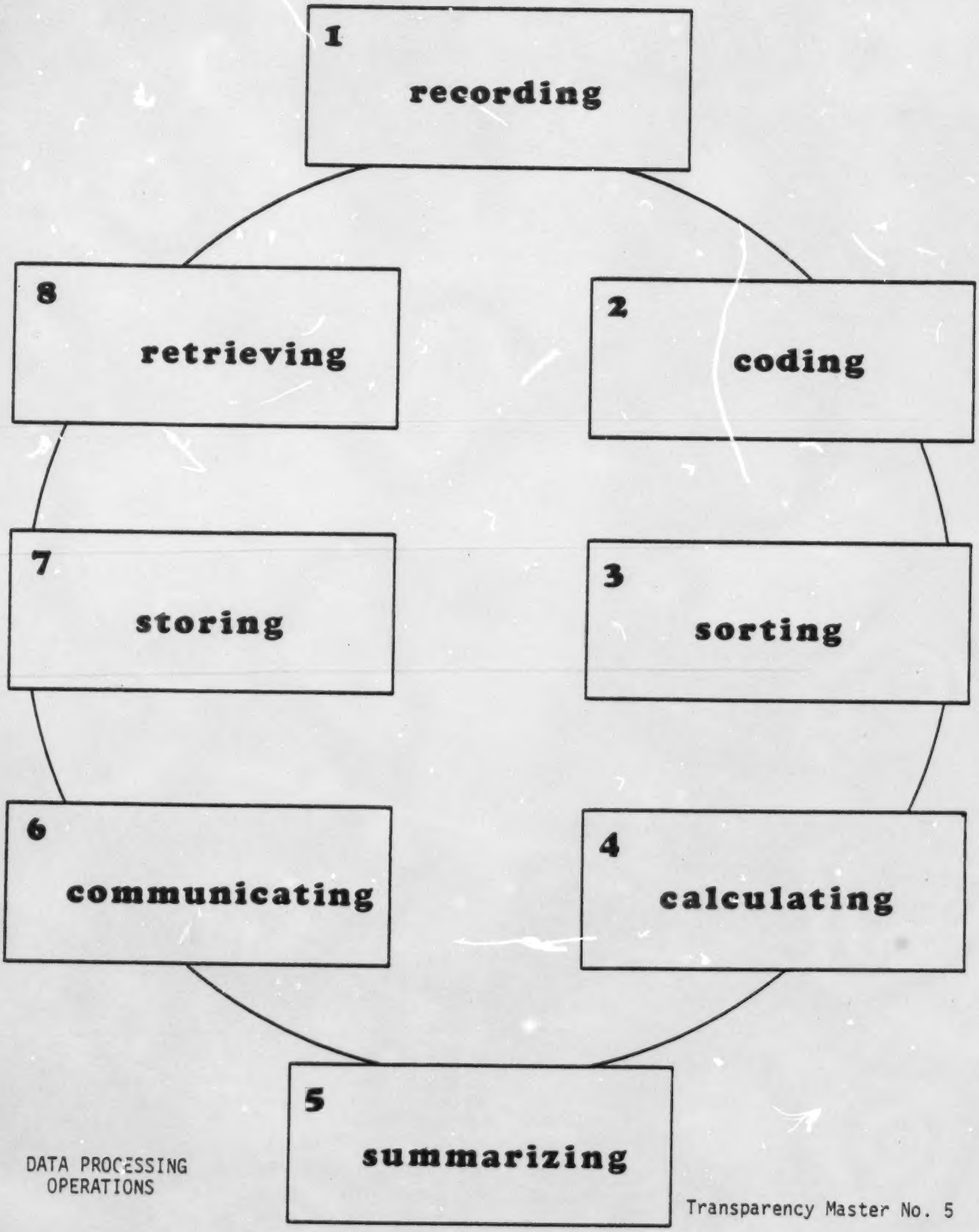


INPUT DEVICES AND CPU



OUTPUT DEVICES AND CPU

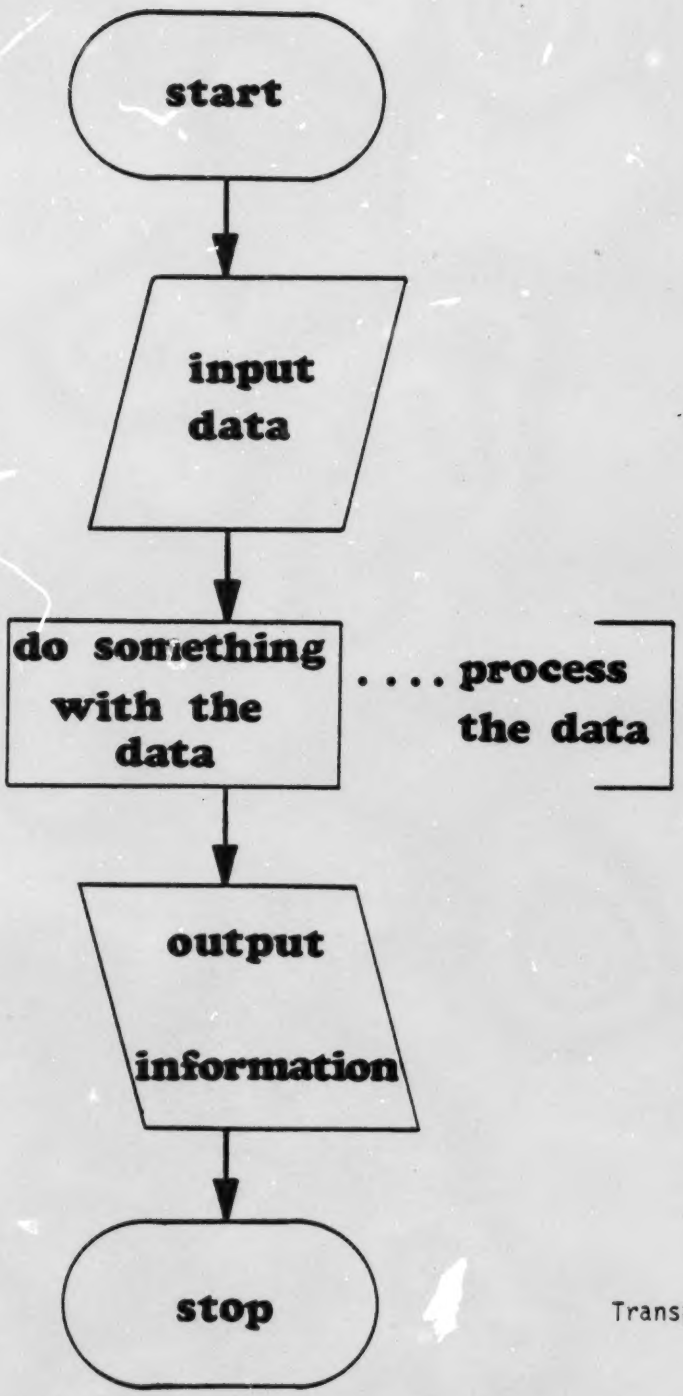
Transparency Master No. 4



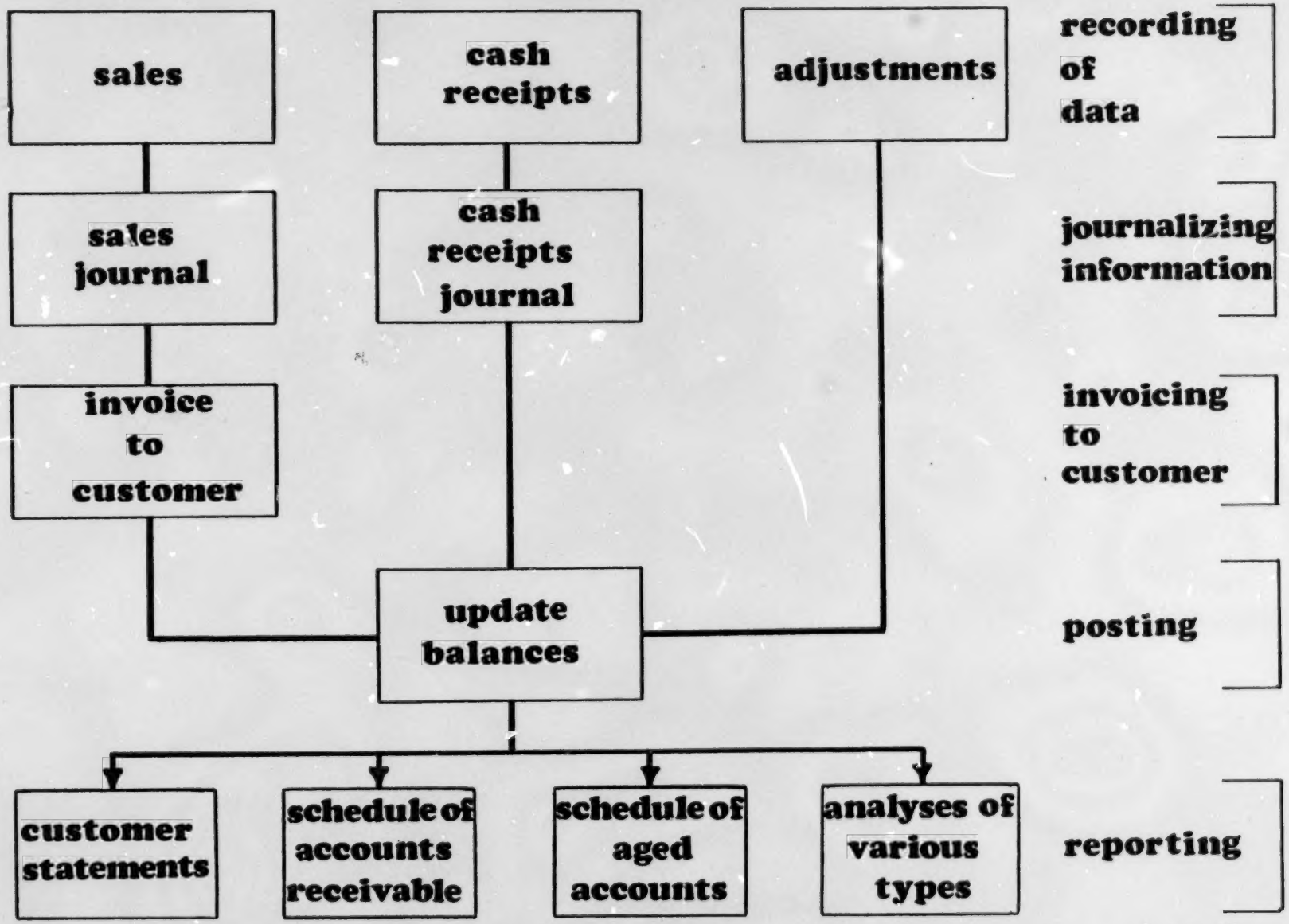
DATA PROCESSING
OPERATIONS

Transparency Master No. 5

THE MEANING OF DATA PROCESSING



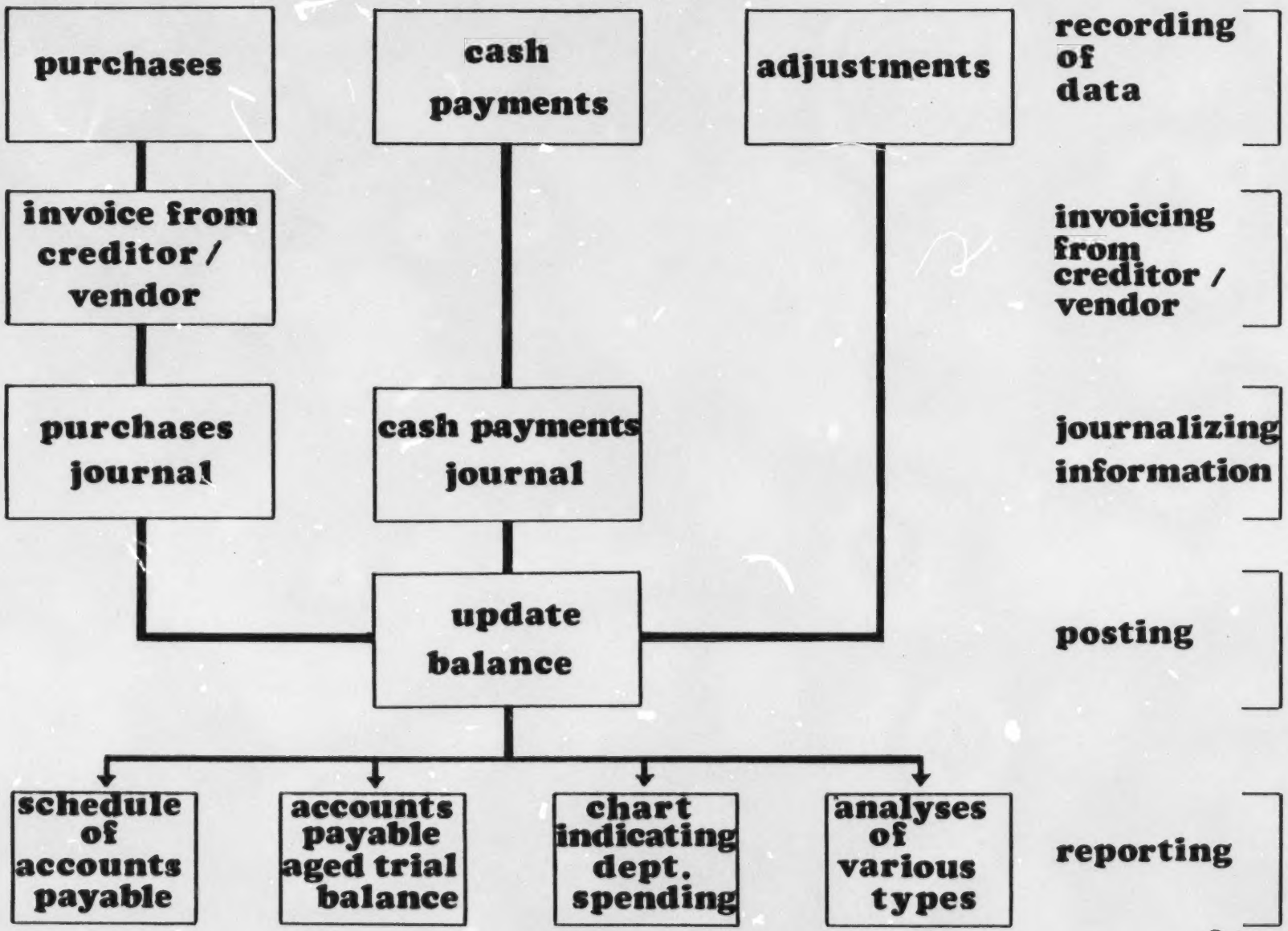
Transparency Master No. 6



293

ACCOUNTS RECEIVABLE STEPS

Transparency Master No. 7



ACCOUNTS PAYABLE STEPS

Transparency Master No. 8